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Human Evolution, Economic Progress and Evolutionary Failure

Bhanoji Rao

With Foreword by Kishore Mahbubani



Human Evolution, Economic Progress and Evolutionary Failure

This monograph is an innovative endeavour in many ways. First, it brings to the fore the synergy between human evolution and economic and social progress. Second, it acknowledges the critical contributions from the routine adherence to contextual truth and contextual non-violence of humanity at large. Finally, it argues that the world is sliding towards evolutionary failure by not moving further forward in the adherence to the two core human values.

For all those interested in development in a holistic sense, the book will inspire thinking and debate. Human evolution will go on – one way or the other – with or without adherence to truth and non-violence. The book stresses the time is now, to go for the best and eschew the worst.

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This book is a humble offering at the lotus feet of
Bhagawan Sri Sathya Sai Baba

In pursuit of His Divine Direction *not* to Stop Writing

Also for

Ratna

My wife, the prompting force behind our material
progress and the storehouse of forgiveness



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Foreword

Humanity is one. As Gandhi said, “All humanity is one undivided and indivisible family”. Yet, we continue to see humanity as divided.

Globalization and technology have shrunk our world. The destinies of all 7 billion people on planet earth are now deeply intertwined. A simple boat analogy, which I used in my book *The Great Convergence*, will explain how interdependent we have become. In the past, when we lived in 193 countries, it was like living on 193 separate boats. Each boat had a captain and crew. And we had rules to ensure that the boats didn’t collide. In our shrunken world, the 7 billion people no longer live on 193 separate boats. Instead, they live in 193 separate cabins on the same global boat. There’s one key problem with this boat. We have captains and crews taking care of each cabin. But no captain or crew taking care of the boat as a whole.

Once we absorb this metaphor, we begin to understand why our world is afflicted with crisis after crisis, which sweep across borders effortlessly. From the financial crisis of 2008/9 to the outbreak of Zika in 2015, from global terrorism to global warming, we see daily evidence that our destinies are now intertwined. This is why this book is so timely. It reminds us of our common destiny as humanity.

Bhanoji Rao taught at the Lee Kuan Yew School of Public Policy for many years. He met students and faculty from all continents. He also engaged in many inter-disciplinary dialogues. Given this global experience at our School, it is not surprising that he has called for the establishment of a group of Intellectuals for Global Peace and Unity under the auspices of UNESCO.

I wish his proposal and the book great success. I hope that it helps to make humanity more aware that we now live together on a small and increasingly imperiled planet. It is time for us to come together on global warming. Let us rise to this pressing global challenge.

Kishore Mahbubani
Professor of Practice and Dean
Lee Kuan Yew School of Public Policy
National University of Singapore

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*For granting me a dream, instructing me not to stop writing
ETC. ETC. ETC.*

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Special Note of Thanks for Permissions

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The following internet sites and the sites of organizations have been generous in granting permissions with source citation as the only obligation: (1) <http://sci.waikato.ac.nz>, (2) The Maddison Project (www.ggdc.net), (3) Wikipedia (<https://en.wikipedia.org>), (4) US Census Bureau, (5) inequality.org, (6) chartbookofeconomicinequality.com, (7) Americans for Democratic Action (ADA), (8) KryssTal.Com, (9) Explain that Stuff, (10) The Pew Forum, (11) <http://www.prb.org/Educators/TeachersGuides>, and (12) The American Humanist Association.

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Prologue

This book first takes stock of the historical trends in human evolution and economic progress.

Then it seeks to find if evolution has continued to its logical end of human transformation.

That such a transformation has not happened is the crux of ‘evolutionary failure’.

The concluding message of the book is that evolutionary failure has to be discussed and addressed consciously *via the united efforts of intellectuals across the globe*.



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1 Introduction and context

1.1 Population growth and multidimensional progress

One can easily grasp a connection between human evolution in terms of growth of populations and economic and social progress. *If the birth and death rates were equal from times immemorial, there will be few if any on this beautiful planet.* Just as the motivation to reduce mortality is part of the desire to survive, the very survival of many leading to positive population growth rates over the millennia has been integral to ‘progress’ on several fronts, backed by innovations of all types in all spheres. It is equally true that the very first movement of progress from hunting and gathering to agriculture and community formations has helped populations to grow with relatively better food supplies.

It is safe to say that progress on the demographic, economic, social and other fronts has been simultaneous when one considers very long stretches of time. Yet, people come first: population growth has challenged the intellectual capabilities of men and women who have contributed great ideas and practical solutions to problems threatening life and livelihood. The wide range of innovations of the past is indeed breathtaking: languages for communication,¹ the conceptualization and measurement of time, a wide range of ancient to modern medicines, human movements across places near and far aided by travel and communication facilities, and many more.

The Population Reference Bureau on its website² provides valuable data on historical estimates of world population. Though it is said that we humans have a three-million-year history, the relatively more recent strides in population numbers [estimates] are as follows: 300 million people in AD 1, 760 million in 1750, and 1 billion in 1800. The Industrial Revolution, rising living standards and significantly reduced threats of famines [thus reducing mortality significantly] have all contributed to rapid population growth. The world in 2016 has a little over 7.3 billion people and the projected number for 2050 is close to 10 billion.

The Angus Maddison estimates of population and Gross Domestic Product (GDP) from the Maddison Project³ by country/continent from AD 1 are helpful in further linking the growth rates of population and output. The population composition across the past 20 centuries is given in Table 1.1. Asia began with a whopping three-quarters share in AD 1. Its share began to move down century

2 Introduction

Table 1.1 World population distribution AD 1–2009 and 2030 [projected]

<i>Year</i>	<i>1</i>	<i>1000</i>	<i>1500</i>	<i>1700</i>	<i>1900</i>	<i>1950</i>	<i>2000</i>	<i>2009</i>	<i>2030</i>
<i>Percent Distribution of World Population</i>									
Europe, US, Canada, Australia, New Zealand	15.4	15.3	20.6	21.3	33.0	29.6	18.7	17.3	14.7
Latin America	2.5	4.3	4.0	2.0	4.1	6.5	8.6	8.6	8.6
Asia	74.6	68.3	64.7	66.6	55.9	54.8	59.3	59.4	58.6
Africa	7.5	12.1	10.6	10.1	7.0	9.0	13.3	14.6	18.1
World Total	100	100	100	100	100	100	100	100	100
<i>Memo</i>									
China	26.4	22.1	23.5	22.9	25.6	21.6	20.8	19.7	17.4
India	33.2	28.1	25.1	27.3	18.2	14.2	16.5	17.1	18.3

Table 1.2 Global GDP distribution, AD 1–2008

<i>Year</i>	<i>1</i>	<i>1000</i>	<i>1500</i>	<i>1700</i>	<i>1900</i>	<i>1950</i>	<i>2000</i>	<i>2008</i>
<i>Percentage distribution</i>								
Europe, US, Canada, Australia, New Zealand	17.5	14.1	24.3	29.5	64.8	69.8	51.1	44.9
Latin America	2.1	3.8	2.9	1.7	3.6	7.8	8.4	7.9
Asia	72.8	70.8	65.0	61.9	28.2	18.6	37.3	43.7
Africa	7.6	11.3	7.8	6.9	3.4	3.8	3.2	3.4
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

after century. The now well-known industrialized world had a growing global share in population from 1 through 1900.

The Maddison estimates of GDP in 1999 international dollars provide the distribution of world GDP by main regions shown in Table 1.2. Asia here, too, began with a high global share of 73 percent, but has lost rapidly since 1700. The present-day industrialized nations put together marched forward from the days of the Industrial Revolution. The Asian share began to move up from the second half of the twentieth century.

The Industrial Revolution and innovations since then brought an enormous shift, with the industrialized nations' global GDP share going up from 29.5 percent in 1700 to 65 percent in 1900 and close to 70 percent in 1950. The decline since then has been rapid. Asia, on the other hand, had a respectable 62 percent share in 1700, declining to 28 percent in 1900 and a little over

18 percent in 1950. The share has improved significantly since: 37.3 percent in 2000, and 43.7 percent in 2008. Asia is now the world's growth engine.

1.2 Literature gap and motivation

Just by going to www.humanevolution.org and accessing the material available on the site, one would obtain an idea of the seven million years of human evolution (HE) – in the *physical sense*. Much has been written on the subject, if not over the millennia, at least in the last couple of centuries. A typical well-endowed library should tell what has been written over the years on the subject. Thus, the National University of Singapore (NUS) library resources, for instance, display a little over 2,600 books when one searches for titles under the subject of human evolution. There is thus no dearth of literature on HE and related topics.

A similar comment applies to literature on economic (and social) progress – EP for short. Countless books, papers and popular articles – both general and in the context of specific regions, nations and sub-national areas – are available on EP. Once again, the NUS library resources display some 1,400 books.

It is important to note, however, that on HE and EP combined, there are only a total of 26 records. A search of titles on evolutionary failure (EF) produces 74 records, and most refer to some dimension or other pertaining to physical evolution and none go into moral and ethical dimensions.

There is yet another focussed approach for a literature search on human evolution and economic progress and evolutionary failure. It is to look at the resources in Econlit, the storehouse of writings on every conceivable topic even remotely connected to economics in general, and economic progress in particular. For human evolution, the database covering 1969–2011 throws up a mere 34 records. Under human evolution and economic progress, there were no records. Under evolutionary failure also, there were none.

Historically, human evolution had taken a course that helped an explosion of numbers: rapid growth of population. Population growth in turn has been behind the pace of economic progress. As discussed in the last chapter of an earlier book (on East Asia⁴) by the author published in 2001, adherence to the two core values of contextual truth and non-violence helped the human race to climb up in numbers and reach 7.3 billion in 2016.

More than any human value, the practice of a certain degree of non-violence has been at the core of human evolution and economic progress since the Industrial Revolution. Indeed, if one were to look at world history, one would discover that the grand culmination of human evolution was the flow of goods, capital and people almost without hindrance during the late nineteenth and early twentieth centuries. The two World Wars and the Great Depression, however, reversed those 'gains', and have led the unfolding of violence on a massive scale.

Many may celebrate the fact that the world since the 1950s has been free from a global war. But problems galore confront the world. Inter-country border

4 *Introduction*

conflicts, terrorism, scams, receiving and paying bribes, restrictions on the free movement of people across countries, gender and racial inequities – in fact, almost all the intra-country and inter-country problems of today [even environmental pollution] are the result of the decline of the consistent practice of contextual truth and non-violence. The lack of such practice is like a pause in human evolution – or what may be called evolutionary failure (EF).

Evolutionary failure is the real, but invisible, process behind the failure of markets, governments, as well as civil society organizations. The hard-earned political freedom helped, and not hindered, the growth of corruption in high places. It also did not stop violence at home, in communities and within and between countries.

This book will look into the undercurrent of human evolution as aiding and assisting economic progress, and then go on to articulate the idea of EF.⁵ The concluding point of the book will be that adherence to contextual truth and non-violence has to be brought to center stage of mainstream knowledge and discourse.

The rest of the book is organized as follows:

Chapter 2 provides a synoptic view of theories of HE. The chapter covers pre-Darwin ideas on evolution and their limits and implications. The chapter will also briefly touch upon the evolutionary ideas in the major religions. The objective is to see how evolutionary ideas themselves have evolved and if the emphasis has been on scientific evidence or simply faith and belief.

Chapter 3 is about human evolution, covering physical and other dimensions. Darwin and post-Darwin ideas on evolution are the core of this chapter. The main purpose of the investigation is to explore the physical and mental dimensions of evolution, with special emphasis on what evolutionary theories have had to say on the practice of values such as truth and non-violence.

Chapter 4 deals with progress covering the period from pre-industrial times to World War I. A key dimension of human progress over the last several centuries has been the phenomenal increase in population. The chapter will trace the pace of demographic change and juxtapose it against economic progress. Historical data on population and economic growth as well as human development will provide the basis for the discourse. Routine adherence to contextual truth and non-violence has been behind the all-round progress of humanity.

Chapter 5 is about trends in economic growth since World War I and the emerging challenges. The world economy and society have changed dramatically since the end of the War. Economic progress since World War II has been largely accompanied by increasing international and intra-national economic disparities. The chapter provides a bird's eye view of the latest contributions on inequality, the mother of all ills plaguing the world at large.

Chapter 6 looks at the concept of evolutionary failure. Evolutionary failure refers to the lack of significant progress on the adherence to contextual truth and non-violence. The adherence that has contributed to phenomenal demographic and economic growth has since taken a back seat, thanks to the apparent worship of wealth and the prompting of greed with its multiple hues such as

gross inequities and environmental degradation. Markets may sanction anything and everything as long as the price is right. *There is no market that can produce truth and non-violence; instead, some have successfully created markets for untruth and violence.* The chapter defines and provides indirect measures of EF. The chapter ends with convincing arguments on the dire necessity to address and correct EF.

The final Chapter (Chapter 7) is about addressing EF. Evolutionary failure can and must be reversed. The chapter provides a succinct mechanism for such reversal – including a simple expose of an agenda.

The book ends with an epilogue – hope for humanity.

Notes

- 1 See Kay, Cartmill and Balow (1998) on the possible links between physical evolution and the language and speech capabilities of humans.
- 2 <http://www.prb.org/Educators/TeachersGuides/HumanPopulation/PopulationGrowth.aspx> [Accessed on November 18, 2011].
- 3 [www.ggdnc.net/maddison/Historical . . . /horizontal-file_02-2010.xls](http://www.ggdnc.net/maddison/Historical.../horizontal-file_02-2010.xls) [Accessed on September 6, 2012].
- 4 Rao, Bhanoji (2001), *East Asian Economies: The Miracle, A Crisis and The Future*, Singapore: McGraw-Hill.
- 5 Evolutionary failure is an extrapolation and extension of the ideas in an earlier work by the author on the Indian economy (Rao, 1993). In the last chapter of that book, it was argued that non-adherence to the two core values has led to rampant corruption as well as verbal and physical violence in many ways.



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Part I

Human evolution



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2 Synoptic view of human evolution via natural selection

2.1 Introduction

The site *dictionary.com*¹ provides as many as ten variants of the meaning of the word ‘evolution’. The one relating to biology states: “change in the gene pool of a population from generation to generation by such processes as mutation, natural selection, and genetic drift”. The same source defines the term ‘human’ as “of, pertaining to, characteristic of, or having the nature of, people”. Combining the two, one could simply say that *human evolution refers to the way people over the generations have changed, including how people have come about in the first place.*

Here is what Wikipedia says² right at the beginning of its long and comprehensive article on human evolution:

Human evolution refers to the evolutionary process leading up to the appearance of modern humans. While it began with the last common ancestor of all life, the topic usually covers only the evolutionary history of primates, in particular the genus *Homo*, and the emergence of *Homo sapiens* as a distinct species of hominids (or ‘great apes’).

Though a reference has been made to the ‘last common ancestor of all life’, the definition moves fast to the evolutionary history of primates.³ Many scientific disciplines such as physical anthropology, primatology, archaeology, linguistics, evolutionary psychology, embryology and genetics help understand human evolution.

A search carried out on November 29, 2011, on JSTOR [<http://www.jstor.org>] for ‘human evolution’ provided over 314,000 references.⁴ Given the huge number of publications reflecting scientific research on human evolution, there is no pretention here to accomplish even modest coverage of the totality of the work on the subject. *In an extremely limited way, therefore, this chapter covers the pre-Darwin ideas on evolution, views of Darwin and his critics plus their limitations and implications.*

The next section covers the evolutionary ideas in the major religions, which were in fact the ideas that persisted prior to Darwin. The central ideas of Darwin

and the views of a few of his critics come next. Then there is a short discussion of the possible missing components in the theories of evolution of the humans. Finally, a summary of the main ideas of the chapter is provided.

2.2 Evolution theories: pre-Darwin

One must consider that as soon as thinking became part of human nature, people wondered about evolution. Most pre-Darwin views on evolution were part of religious beliefs. The website of the Pew Forum on Religion and Public Life (*with its generous policy on use of its material*)⁵ has short essays on the evolution ideas/theories contained in different religions, and references pertaining to those views for further study. The coverage includes the following faiths: Buddhism, Catholicism, Church of Jesus Christ of Latter-day Saints, Episcopal Church, Evangelical Lutheran Church of America, Hinduism,⁶ Islam, Judaism, Lutheran Church-Missouri Synod, Presbyterian Church (USA), Southern Baptist Convention, United Church of Christ and United Methodist Church.

The World Factbook by the US Central Intelligence Agency⁷ provides the following distribution of the world population by major religions: Roman Catholic Christians 17 percent,⁸ Muslim 23 percent, Hindu 14 percent and Buddhist 7 percent – making up close to two-thirds of the total world population.⁹ Views of the four major faiths on evolution are summarized in the following few paragraphs.

Buddhism

The PEWFORUM site notes:

Many Buddhists see no inherent conflict between their religious teachings and evolutionary theory. Indeed, according to some Buddhist thinkers, certain aspects of Darwin's theory are consistent with some of the religion's core teachings, such as the notion that all life is impermanent.¹⁰

The Dalai Lama's 2005 publication, *The Universe in an Atom: The Convergence of Science and Spirituality*, brought out by the Crown Publications Group, tries to make the case that modern science and Buddhist thought have surprisingly similar aims, methods and sometimes conclusions – though he resists efforts to see the world in purely material terms. Some of his thoughts about limits to the theory of evolution when it comes to how life and consciousness began earned him a rather harsh book review by George Johnson in the New York Times (September 18, 2005), including a suggestion that he was proposing a Buddhist version of intelligent design.

The ideas of a Buddhist differ, as in the view available from Stephen Asma's article in the *Chicago Tribune* (March 23, 2011). He says: "Buddhism doesn't have a creator God, like we find in the book of Genesis. . . . it's never had a war with science, unlike the science-religion skirmishes that plague Christianity and

Islam”. The author cites a 2009 poll in the *Christian Science Monitor*, and notes that “Buddhism was the religion most comfortable with evolution theory”.

At <http://www.buddhanet.net> under *good question, good answer* by Venerable Dhammika, the question was posed: What does the Buddha say about the origin of the universe? Here the answer is ‘attributed’ to the Buddha, or more precisely the Aganna Sutta supposedly crafted by Him: “The first life formed on the surface of the water and again, over countless millions of years, evolved from simple into complex organisms. All these processes are without beginning or end and are set in motion by natural causes”. Well then, one might say Darwin was internally inspired by the Buddhist doctrine!

Catholicism

The Catholic Church generally accepts evolutionary theory as the scientific explanation for the development of all life. . . .with the understanding that natural selection is a God-directed mechanism of biological development. . . .¹¹

On August 12, 1950, Pope Pius XII promulgated the Papal *Encyclical (Humani Generis)* addressed to the various levels of clergy and the general public.¹² The following is an extract (paragraph 36) from the document¹³ on evolution.

. . . Church does not forbid . . . research and discussions . . . with regard to the doctrine of evolution . . . provided that all are prepared to submit to the judgment of the Church. . . . Some . . . transgress this liberty . . . , when they act as if the origin of the human body from pre-existing and living matter were already completely certain. . . .

A little over five and a half decades later, in 2007, Pope Benedict, in a German publication *Schoepfung unt Evolution* (Creation and Evolution), did not endorse the creationist, or intelligent design,¹⁴ view of life’s origins. Even so, the Pontiff felt that scientific view was rather narrow and recommended a broader approach. Not quite agreeing with the strictly scientific view, he favoured the view that God created life through evolution, also known as ‘theistic evolution’.¹⁵

Hinduism

The PEW site¹⁶ says:

While there is no single Hindu teaching on the origins of life, many Hindus believe that the universe is a manifestation of Brahman, Hinduism’s highest god and the force behind all creation. However, many Hindus today do not find their beliefs to be incompatible with the theory of evolution.

The site provides two reference links: *Hinduism Today: The Secret Dairy of Charles Darwin*, and *Beliefnet.com, Ask the Swami: Dharma vs. Darwin. The*

12 *Human evolution*

*Secret Diary of Charles Darwin*¹⁷ speaks about what Darwin learnt from a Holy man: “I now see it all so rightly. . . .” It is not any longer the transformation of one species into another, but it is one of decent and decline. The second reference is to an article by Swami B. V. Tripurari.¹⁸ An important point the Swami makes is that Darwin’s theory cannot explain how human consciousness has evolved.

Though not mentioned on the PEW site, one could also refer to the Bhagavad Gita, the scripture that is among the most consulted and referred to. According to the Gita, the five key ingredients of all creation are Isvara (the Supreme Lord), Jiva (the living entity), Prakriti (nature), Kala (eternal time) and Karma (activity).¹⁹ Consciousness, common to all living beings, has an important role in directing evolution. That consciousness, common to all, is devoid of name and form. It has a crucial role in the physical, mental and spiritual evolution of living beings.²⁰

Islam

The site <http://www.masud.co.uk/> is described as “One of the Web’s Leading and Original Resources for Traditional Islam since 1996”. On the site was an explanatory statement on Islam and evolution crafted by Nua Ha Mim Keller [© 1996]. The title of the statement was “Islam and Evolution: a letter to Suleman Ali”²¹ and was a response to a question on the Quranic account of Creation.

The fairly long and comprehensive response is not summarized here, but a few points of relevance are noted: the theory of evolution by natural selection *does not* explain the evolution of human consciousness; while evolution within a species can be easily understood, there is a lack of evidence for evolution of one species transforming into another; and in the words of the Qur’an, “Allah is the Creator of everything” (Qur’an 13:16).

Finally

Across and within different religions, there are numerous views/ideas on evolution, and the aforementioned is a meagre sample. The explanations and extrapolations being diverse, it is not possible to obtain from them a theory of evolution with universal acceptability.

2.3 Evolution of the ‘scientific theories’ of evolution

This is a relatively short note of what could potentially occupy a huge volume or a number of volumes. All sorts of beliefs and hypotheses were in vogue up until the dawn of modern science in the late seventeenth or early eighteenth centuries.²² The main point of early scientific traditions is to look for answers in the laws of nature to explain natural phenomena.²³ While the scientific method could relatively easily make inroads into other realms, it was less easy in respect of the explanation of the origin and evolution of human beings.

Box 2.1 has been culled out of various essays/articles readily available on the web interlinked with the Wikipedia articles on human evolution. The sum and substance of the information is to point out that human evolution has not happened in isolation – though the humans have been added onto the then-existing species relatively recently: the modern human has a 100,000-years-old origin traced to Africa – an issue that has not been settled fully but is accepted generally (Stringer, 2002, see also Box 2.2 below).

**Box 2.1 Evolution of scientific ideas on evolution:
selected scholars and brief summaries of
their contributions**

John Ray [1627–1705] classified plants as per similarities and differences. He wrote that *one species never springs from the seed of another* and vice versa.

Pierre Louis Maupertuis [1698–1759] thought of the inevitable perishing of the species not fit to live, which is like a foreteller of the theory of natural selection.

Carl Linnaeus [1707–1778] classified humans among the primates. At one time, he observed several monkeys and felt that there were many similarities between them and humans. According to him, monkeys belonged to *Anthropomorpha* (man-like). This received much criticism.²⁴ Subsequently, he changed his views and replaced the term *Anthropomorpha* with *Primates*. He also gave the classification of *Homo sapiens* for the humans. It is thus clear that humans and similar species are together in the *Primates*. *He wrote that man has a soul plus nobility while animals have a soul too.*

Count de Buffon [1707–1788] propounded the idea that different regions have different plants and animals (Buffon's Law). He felt that despite similarities between humans and apes, they may not share a common origin.

Erasmus Darwin [1731–1802] felt that lust, hunger and security are three objects of desire for every organism; and the strongest and most active animal should propagate the species. [Note: Charles Darwin was a grandson of Erasmus Darwin.]

Jean-Baptiste Lamarck [1744–1829] propounded a theory of evolution with two components: organisms have an inherent tendency to constantly move up in complexity; and organisms adapt to their environment.

Charles Darwin [1809–1882], in part influenced by the work of T. R. Malthus, felt that growth of population would lead to struggle for existence, where the strong will prevail and the weak will perish. At the end of 1859, Darwin's *On the Origin of Species* was published, with detailed explanation of *natural selection*.²⁵

Gregor Mendel [1822–1884], the originator of Mendel’s laws of inheritance,²⁶ observed that traits are inherited.

Thomas Henry Huxley [1825–1895] showed that humans and apes have common ancestry.

Alfred Russel Wallace [1823–1913], independent of Darwin, formulated the theory of evolution based on natural selection. Darwin acknowledged the similarity of his and Wallace’s views on evolution. Wallace, on his part, defended Darwin and his theory.²⁷

August Weismann [1834–1914] discovered that heredity passes through germ cells (sperm and eggs).

Ronald A. Fisher [1890–1962] published *The Genetical Theory of Natural Selection* in 1930. Two of his key ideas/results are: with increasing magnitude of a mutation, there is a proportional decrease in the fitness of the organism; and larger populations carry more variation and have a larger chance of survival.

J. B. S. Haldane²⁸ [1892–1964], together with Sewall Wright and Ronald Fisher, contributed to theoretical population genetics and modern evolutionary synthesis.²⁹

James Watson [b 1928] and Francis Crick [1916–2004] published the structure of DNA,³⁰ and demonstrated the physical basis for inheritance. The DNA molecule contains genetic information and is the transmission medium for passing on heritable traits from one generation to the next. Molecular biology has significantly improved our understanding of the relationship between genotype (genetic makeup³¹) and phenotype (observable makeup, resulting from the interaction of genotype and the environment). However, a significant part of the variation in phenotypes in a population is explained not by differences in environments, but by differences between genotypes. That even a small difference in genotype could lead to dramatic difference in phenotype is illustrated by the difference between chimps and humans, with only a 5 percent difference in their genomes.

Box 2.2 Chronological history of life

Plants and fungi appeared 500 million years ago; amphibians (such as frogs) 364 million years ago; birds around 155 million years ago; mammals around 129 million years ago; hominines ten million years ago; and modern humans 250,000 years ago. *Extinction* of an entire species is not unusual. Global warming of an unexpected level might increase the rate of extinction.

2.4 Darwin on evolution

Charles Robert Darwin (1809–1882), the father of the idea of evolution by natural selection, wrote several books (Appendix 2B has a list of selected works). Those considered most important are: *On the Origin of Species by Means of Natural Selection* (1859), *Descent of Man and Selection in Relation to Sex* (1871) and *Expressions of Emotions in Man and Animals* (1872).

In his introduction chapter of *Origin of Species*, at the very beginning, Darwin says:

When on board H.M.S. ‘Beagle,’ as naturalist, I was much struck with certain facts in the distribution of the inhabitants of South America. . . . These facts seemed to me to throw some light on the origin of species. . . .

Here is one simple and succinct summary of Darwin’s theory from pbs.org:³² “Living organisms have descended with modifications from species that lived before them. Natural selection explains how this evolution has happened. . . . Species whose individuals are best adapted survive; others become extinct”.

The ideas of Darwin have the most impact on contemporary thinking of how humans have evolved. The central idea of Darwin’s theory of evolution is that living organisms have descended with modifications from species that lived before them.

Behind evolution is the process of natural selection (see Appendix 2C for excerpts from Darwin’s *Origin of Species*). Natural selection takes the form of competition and struggle between living organisms for life-sustaining necessities since resources are limited. The ‘fit enough’ survive and reproduce.

2.5 Post-Darwin syntheses

Howard Hughes Medical Institute website has an article by Dr Steve Mirsky with the title, ‘How Did We Get Here?’³³ Mirsky notes that Darwin and post-Darwin thinking of evolution based on natural selection is in opposition to the long-held belief ‘that each species was independently created by divine fiat and remained immutable’. But, the issue still remained on how natural selection functioned and from where it was emanating.

Mirsky refers to the work of Thomas Hunt Morgan at Columbia University who “went through millions of tiny fruit flies to track heredity in the 1910s and 1920s”. It was found that mutations occurred in genes, and heredity had a physical basis.

Evolution is via procreation as well as natural selection. Thus, the existence of a lot of hair among the Neanderthals³⁴ beings was a matter of necessity in the cold climate of the Ice Age. Cross-breeding has indeed taken place and moulded the features retained. For a while it was assumed that there was no interaction between the modern humans (*Homo sapiens*) and the Neanderthals.

As noted in an article in *The Economist* of February 2014, “Sixty thousand years ago, when modern humans first left Africa, they encountered other species of humanity, such as Neanderthals. . . in Europe and Asia”.³⁵

The Economist refers to two recent studies, one published in *Nature*³⁶ and the other in *Science*,³⁷ that have shown evidence of miscegenation. The study published in *Science*, for instance, found that though the amount of Neanderthal DNA in any individual was small, around 20 percent of it was recovered from the study sample of 665 persons. *The Economist* noted: “an impressive figure for an extinct species” and “. . . Neanderthals may be gone. But their DNA ghosts linger on”.

Economists on Darwin

Within the economics fraternity, several believed that Thomas Malthus’ *Theory of Population* and Adam Smith’s *Wealth of Nations* had a strong influence on Darwin. “Economists stick to the image of (Darwin as) a biologist. . . . This emphasis even leads them to reject Darwin’s other works, especially those on social evolution” (Marciano, 2007, p.686). The idea of the survival of the fittest was behind Darwin’s theory of natural selection. Its application to human societies was the work of Herbert Spencer.³⁸

Box 2.3 Reference to Malthus by Darwin

“In the . . . chapter the Struggle for Existence amongst all organic beings throughout the world . . . will be treated. . . . This is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms. As many more individuals of each species are born than can possibly survive; . . . it follows that any being, if it vary however slightly in any manner profitable to itself, . . . will have a better chance of surviving, and thus be NATURALLY SELECTED”.

From Darwin’s Introduction chapter of *Origin of Species*

2.6 Evolution of *Homo sapiens*

For the purpose of this book, the central concern is what has happened to man since his first proper ancestors have come into being. It is about the man’s own physical and mental evolution over the millennia.

Human form’s physical evolution: in a nutshell

This short section is based on the University of Waikato School of Science and Engineering website on Evolution for Teaching (by A. Campbell, P. Cooke, K. Earle and K. Otrrel-Cass).³⁹ Scientific findings on the evolution of the humans

progressed a great deal after the 1871 publication of *The Descent of Man* by Darwin. Much of the progress depended on fresh discoveries of fossils and inferences on how the apes-to-humans transition took place across the globe. A wide variety of ancestors for the humans were identified: for instance, *Homo habilis* living between 2.4 to 1.5 million years ago, and the relatively more well-known *Homo erectus*, in existence between 1.8 million and 300,000 years ago.

The Indonesian island of Flores revealed the existence of *Homo floresiensis*, estimated to have lived just about 18,000 years ago, with an adult female height of only a meter (“*floresiensis* was a dwarfed species that evolved from *H. Erectus*”⁴⁰). These findings added a new dimension to the understanding of the evolution of present-day humans.

Based on three hominine skulls of some 1.8 million years old discovered at Dmanisi, Georgia, it was observed that they, too, were closely linked to *H. erectus*, and affirm further the variability possibilities within the group. Next we come to the half-a-million-year-old archaic *H. sapiens*, intermediate to *H. erectus* and the fully developed human. An archaic *H. sapiens* skull has an average cranial capacity mid-way between the two.

Immediately prior to the full-blown humans were the Neanderthals, who lived between 230,000 and 30,000 years ago, during the last Ice Age. Their remains were found in Europe and Middle East. In their last stages prior to extinction, they co-existed with modern humans.

Modern humans and continuing evolution

As per available evidence, the earliest modern human lived some 160,000 years ago in Africa.⁴¹ This lends credence to the ‘Out of Africa Hypothesis’, which essentially says that the origin was Africa and the migration was to other regions.

An important feature of human evolution has been the development of the skull, and rising cranial capacity. It has also been noted that body size and brain size have a strong correlation. In fact, scientists have studied the development of almost each and every one of the key organs and their components – from face, mouth and teeth to thighs, legs and feet. The discourse could also embrace issues such as why human teeth are small and neatly arranged, how the two feet and the legs help in posture and movement, why facial features have changed over time, and why men and women differ in some features.

Evolution from ape to man has also seen changes in the way life has been orchestrated and organized with evolving improvements in tools, fire-making, shelter, clothing, domestication of plants and animals, arts and crafts, cooperative and social organization and so on.⁴²

And evolution is continuing. What surprises are in store is anybody’s guess. It is not just one person with in-built resistance to tuberculosis (TB) that can pass on the attribute to her progeny; a whole nation has been freed from the dreaded TB, thanks to the development of vaccines that prevent its onslaught. Attempts are now underway to fight many complex diseases, such as presently untreatable cancers, HIV/AIDS and so on. Science and medicine travelled a

long stretch from the days when natural selection and survival of the fittest alone were behind evolution. Yet, none can forestall surprises that keep springing from Mother Nature, and hence, even the best scientific theories on evolution may have to be ‘tentative’.

2.7 Critics of Darwinism

From the time of publication of Darwin’s work, numerous critics opined on the problems in accepting Darwin’s ideas on evolution. The critics varied from preachers and journalists to scientists and (surprisingly) the legal fraternity.⁴³

Numerous sites provide a whole host of listings of critics and their ideas. For instance, the Veritas Forum at the University of California, Santa Barbara listed ten critics along with brief accounts of their works and views.⁴⁴ Critics being numerous, the works of just two are mentioned below.

Among those who felt Darwinian Theory was wrong was the highly reputed scientist–astronomer Sir Fred Hoyle. In his 1999 book on the math of evolution,⁴⁵ he raises important questions pertaining to the theory. “. . . Hoyle’s conclusions point to possible weak spots and unfinished parts in the neo-Darwinian theory of evolution” notes Gert Korthof in his review of Hoyle.⁴⁶

Another critic, Michael Ruse (2009, p.19), concludes on Darwin:

Even when he thought we are special . . . he strove to show that this stemmed from general principles. . . . I would say that those who want to address the question of human evolution could do far worse than turn to the thinking of Charles Darwin.

Appendix 2A

DNA at the core

The aim of this short appendix is to showcase the Genome project site.⁴⁷ The following are a few summary points from the site.

Dogs give birth to dogs. The same holds true for all living creatures. The basis for this natural phenomenon is found in DNA (deoxyribonucleic acid). The DNA molecule “contains the biological instructions that make each species unique”. During reproduction, the DNA is passed on to the offspring.

DNA is made of chemical building blocks or smaller molecules called nucleotides. DNA’s winding, two-stranded chemical structure, known as a ‘double helix’ that looks like a twisted ladder, gives DNA the power to pass along biological instructions with great precision.

Appendix 2B

List of selected books by Charles Darwin⁴⁸

- 1839:** *Journal of Researches into the Natural History and Geology of the Countries Visited During the Voyage of H. M. S. Beagle*. London: Henry Colburn Publishers.
- 1842:** *Geological Observations of South America – The Structure and Distribution of Coral Reefs*. London: Smith, Elder Publishers.
- 1844:** *Geological Observations of South America – Volcanic Islands*. London: Smith, Elder Publishers.
- 1846:** *Geological Observations of South America – South America*. London: Smith, Elder Publishers.
- 1851:** *Monograph of the Fossil Lepididae*. Paleontological Society of England.
- 1854:** *Monograph of the Fossil Balanidae*. Paleontological Society of England.
- 1859 November 22:** *On the Origin of Species by Means of Natural Selection: Or, the Preservation of Favoured Races in the Struggle for Life*. London: John Murray Publishers.
- 1862:** *On the Various Contrivances by which British and Foreign Orchids are Fertilized by Insects*. London: John Murray Publishers.
- 1864:** *The Movement and Habits of Climbing Plants*. London: Linnaean Society.
- 1868:** *The Variations of Animals and Plants under Domestication*. London: John Murray Publishers.
- 1871:** *The Descent of Man and Selection in Relation to Sex*. London: John Murray Publishers.
- 1872:** *The Expression of the Emotions in Man and Animals*. London: John Murray Publishers.
- 1875:** *Insectivorous Plants*. London: John Murray Publishers.
- 1876:** *The Various Contrivances by Which Orchids Are Fertilized by Insects; and The Effects of Cross and Self Fertilization in the Vegetable Kingdom*. London: John Murray Publishers.
- 1877:** *The Different Forms of Flowers on Plants of the Same Species*. London: John Murray Publishers.
- 1878:** *Erasmus Darwin*. London: John Murray Publishers.
- 1879:** *The Movement and Habits of Climbing Plants*. London: John Murray Publishers.
- 1881:** *The Formation of Vegetable Mould, through the Actions of Worms, with Observations on Their Habits*. London: John Murray Publishers.

Appendix 2C

Notes on Darwin's *Origin of the Species*

This appendix aims at putting together the main points of Darwin's 1859 publication *On the Origin of Species by Means of Natural Selection*⁴⁹ The book has 14 chapters: (1) Variation under domestication, (2) Variation under nature, (3) Struggle for existence, (4) Natural selection, (5) Laws of variation, (6) Difficulties on theory, (7) Instinct, (8) Hybridism, (9) On the imperfection of the geological record, (10) On the geological succession of organic beings, (11) Geographical distribution, (12) Geographical distribution (continued), (13) Mutual affinities of organic beings: morphology, and (14) Recapitulation and conclusion.

The following are short summaries of some of the main ideas in selected chapters.

Chapter 1: Variation under domestication: Plants yield new varieties. Atmospheric changes produce variations in plants, but not so much in animals. Inheritance of characteristics such as albinism, prickly skin, hairy bodies, etc., is the general rule. The role of natural selection is in determining which characteristics are preserved and which are not over long spells of time under changing conditions.

Chapter 3: Struggle for existence: Struggle for existence necessitates the preservation of variations helping existence. Darwin says: "I have called this principle, by which each slight variation, if useful, is preserved, by the term of Natural Selection . . ." (p.61). Furthermore, he says: "It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms; for in this case there can be no artificial increase of food, and no prudential restraint from marriage" (p.63).

Chapter 4: Natural selection: Natural selection involves the preservation of favourable variations and rejection of injurious variations. The strong male will have more access to the females and hence more progeny are likely. This sexual selection is in some sense a variant of natural selection. Natural selection in due course could lead to the extinction of some species if the relevant survival features could not be preserved and passed on.⁵⁰

Chapter 6: Difficulties on theory: There are several difficulties with the theory, and one must applaud Darwin for discussing them. For instance, one problem is why we do not see the transitional forms from one species to the next. Darwin suggests that transitions are not seen since natural selection and extinction go together.

Chapters 11 and 12: Geographical distribution: Inhabitants of different regions differ mostly due to modifications through natural selection. To a relatively minor degree, there was also the direct influence of climatic and other physical conditions. Over long periods of time, migration also influences geographical distribution.

Chapter 14: Recapitulation and conclusion: Here is one key message of Darwin:

Nothing at first can appear more difficult to believe than that the more complex organs and instincts should have been perfected, not by means superior to . . . human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor (p.399).

It is the struggle for existence that presides over selection.

Appendix 2D⁵¹

Key points from Herbert Spencer's 1857 article on progress⁵²

A key attribute of progress is that it should “directly or indirectly tend to heighten human happiness . . .” (p.446).

Earth, life upon it, society, government, manufacturing, commerce, art, etc. evolve from simple to complex.

In sum, “From the remotest past . . ., down to the novelties of yesterday, that in which Progress essentially consists is the transformation of the homogeneous into the heterogeneous” (p. 465).

The above is the forerunner to what we have come to consider as development: the widening of choices facilitated by the movement from homogenous to heterogeneous.

Notes

1 Accessed on April 22, 2013.

2 Accessed on April 21, 2013.

3 Primates are “any of various omnivorous mammals . . . especially distinguished by the use of hands, varied locomotion, and by complex flexible behaviour involving a high level of social interaction and cultural adaptability”.

Mammal is “any vertebrate of the class Mammalia, having the body more or less covered with hair, nourishing the young with milk from the mammary glands, and . . . giving birth to the live young” (dictionary.com [Accessed on April 21, 2013]).

4 On February 19, 2013, when EBSCO Business Source Complete was searched, the number of titles was sharply down to 1,191, and just 541 when the option was refereed journal publications. The rather unexpected fact is that these results included many papers on human resource management and its evolution, human capital, and even the evolution of foreign direct investment!

5 <http://www.pewforum.org/science-and-bioethics/religious-groups-views-on-evolution.aspx> [Accessed on January 2, 2013]. Note: “Pew Research Center provides its research – free of charge – as a public service to policymakers, researchers, journalists and the general public, and encourages the use of our material in its original form” (<http://www.pewresearch.org/about/use-policy/>).

6 Based on the elegant chart at <http://www.beliefnet.com/columnists/religion101/2012/10/how-old-are-the-religions.html> [Accessed on August 11, 2014]. One notes that Hinduism happens to be the oldest religion of some 4,000 years.

- 7 <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html> [Accessed on January 19, 2014].
- 8 The Christian population as a whole was 33 percent: Roman Catholics 17 percent, Protestants 6 percent, Orthodox 4 percent, Anglican 1 percent, and others 5 percent.
- 9 The full range adding up to 100 is as follows: Christian 33, Muslim 23, Hindu 14, Buddhist 7, Other 11, Non-religious 10, and Atheists 2.
- 10 <http://www.pewforum.org/science-and-bioethics/religious-groups-views-on-evolution.aspx> [Accessed on January 2, 2013].
- 11 <http://www.pewforum.org/science-and-bioethics/religious-groups-views-on-evolution.aspx> [Accessed on January 2, 2013].
- 12 http://www.vatican.va/holy_father/pius_xii/encyclicals/documents/hf_p-xii_enc_12081950_humani-generis_en.html [Accessed on May 1, 2014].
- 13 The document in full runs into 18 pages (Times New Roman double spacing).
- 14 Intelligent design argues that some forms of life are too complex to have evolved randomly, as Charles Darwin proposed in his 1859 book *The Origin of Species*. Such complex evolution was only feasible via a higher intelligence, though it was not quite named as God. Some think that this is nothing more than another way of placing God as the creator.
- 15 <http://www.dailymail.co.uk/news/article-447930/Pope-Benedict-believes-evolution.html> [Accessed on May 1, 2014].
- 16 <http://www.pewforum.org/2009/02/04/religious-groups-views-on-evolution/> [Accessed on May 1, 2014].
- 17 <https://www.hinduismtoday.com/modules/smartsection/item.php?itemid=825> [Accessed on May 1, 2014].
- 18 <http://www.beliefnet.com/Faiths/Hinduism/2004/04/Ask-The-Swami-Dharma-Vs-Darwin.aspx> [Accessed on May 1, 2014].
- 19 <http://www.iskconbooks.com/Five-basic-truths-explained-in-Bhagavad-Gita.aspx> [Accessed on May 1, 2014].
- 20 In the opinion of this writer, it is great to consciously keep remembering that all creation has one common element, namely consciousness. That unifies one and all. Then there should not be any violence of any type at all anywhere on the earth.
- 21 <http://www.masud.co.uk/ISLAM/nuh/evolve.htm> [Accessed on May 1, 2014].
- 22 Up until the end of the fifteenth century [or the end of the Middle Ages, 1066–1485], there were both the ideas such as one species leading to another and also all creation emanating from some divine script/order/law.
- 23 http://en.wikipedia.org/wiki/History_of_science [Accessed on August 19, 2014] has the following definition of science: “Science is a body of empirical, theoretical, and practical knowledge about the natural world, produced by scientists who emphasize the observation, explanation, and prediction of real world phenomena”. The site points to the evolution of science from the eighteenth century onwards, and notes that “the history of science, especially of the physical and biological sciences, was often presented in a progressive narrative in which true theories replaced false beliefs”.
- 24 There was much opposition to this view from not only theologians but also others of the Christian faith. Since man was created in the image of God, it was difficult to think that the monkey, too, could share the attribute. One would not expect such a criticism from the Hindu faith since Sri Anjaneya (referred to as the monkey God by those that follow other faiths) has been worshipped as God incarnate.
- 25 *A brief on natural selection*: Organisms produce more progeny than can survive, which vary in their ability to survive and reproduce. They compete for survival

and reproduction. Traits that help in survival over competitors are passed on while the not-so-useful are not passed on. For example, if height happens to be advantageous, that trait is passed on. There is constant adaptation of organisms to their habitats. The process might involve changes in some of the traits of the organism to suit the environment. The latest indications for *common descent*, and the most quoted example: DNA sequence comparisons between humans and chimpanzees showed that they shared 98 percent of their genomes.

- 26 Modern science teaches us that via DNA, information is transmitted from parents to children and generation to generation. While some sort of theorizing prevailed since the fourth century BC, the world had to wait for Gregor Mendel for laying the foundation for modern genetics.
- 27 See Collard, David (2009), Alfred Russel Wallace and the Political Economists, *History of Political Economy*, 41(4), 605–644.
- 28 Professor Haldane's passion for empirical evidence was considered to be the force behind his being an atheist. He was with the Universities of Cambridge and London. In 1956, he left the University College, London and joined the Indian Statistical Institute. He eventually became an Indian citizen.
- 29 The modern evolutionary synthesis of the 1920s and 1930s connected natural selection, mutation theory and Mendelian inheritance into a unified theory.
- 30 See Appendix 2A on DNA.
- 31 Inherited traits are based on genes. The set of genes within an organism is the genotype. The full hereditary information is the genome.
- 32 http://www.pbs.org/wgbh/evolution/educators/course/session2/explain_c_pop2.html [Accessed on March 15, 2014].
- 33 <http://www.hhmi.org/biointeractive/evolution/howdidwegethere.html> [Accessed on October 16, 2012].
- 34 Named after the Neanderthal Valley in Germany where evidence of Neanderthal man was first found.
- 35 Human Evolution: The Kissing Cousins, *The Economist*, February 1, 2014.
- 36 Sankararaman, S; Mallick, Swapan; Dannemann, Michael; Prüfer, Kay; Kelso, Janet; Pääbo, Svante; Patterson, Nick and Reich, David. (2014), The Genomic Landscape of Neanderthal Ancestry in Present-day Humans, *Nature*, 507, 354–357, [print edition March 20, published online January 29].
- 37 Vernot, Benjamin and Akey, J M (2014), Resurrecting Surviving Neanderthal Lineages from Modern Human Genomes, *Science*, 343(6174), 1017–1021, [print edition February 28, online January 29].
- 38 Spencer's works referred to by Marciano: *The Principles of Psychology*, London: Longmans, 1855; Progress: Its Law and Causes, *The Westminster Review*, 1857, 67: 445–465; and, *First Principles*, London: Williams and Norgate, 1862. Some excerpts from the article on *Progress* are given in Appendix 2D.
- 39 <http://sci.waikato.ac.nz/evolution/HumanEvolution.shtml> [Accessed on October 16, 2012].
- 40 Ibid.
- 41 Based on <http://en.wikipedia.org/wiki/Human> [Accessed on June 11, 2013], *Homo sapiens* originated in Africa. The human lineage diverged from the last common ancestor with its closest living relative, the chimpanzee, some five million years ago. See also <http://www.nhm.ac.uk/nature-online/life/human-origins/modern-human-evolution/index.html> [Accessed on October 16, 2012].
- 42 Humans are distinguished from other animals by a relatively larger brain with a particularly well-developed neo-cortex, prefrontal cortex and temporal lobes. [It is proven or perhaps believed that the brain, etc., have evolved to a level that enables mental capabilities such as abstract reasoning, language, introspection, problem solving, etc.] Humans are also the one species credited with creating

complex social structures, some competing and some cooperating. (Based on <http://en.wikipedia.org/wiki/Human> [Accessed on June 11, 2013]).

- 43 Phillip Johnson in his book *Darwin on Trial*, Washington: Regnery Gateway Publishing Company, 1991; takes issue with the 1981 Louisiana State Law requiring schools to teach not only the science of evolution but also ‘creation science’.
- 44 <http://www.veritas-ucsb.org/library/origins/quotes/critics.html> [Accessed on December 8, 2014].
- 45 *Mathematics of Evolution*, Memphis, TN: Acorn Enterprises LLC, 1999.
- 46 <http://wasdarwinwrong.com/kortho46.htm> [Accessed on December 8, 2014].
- 47 <http://www.genome.gov/25520880#top> (Courtesy: National Human Genome Research Institute [Accessed on May 22, 2013]).
- 48 Based on http://www.aboutdarwin.com/literature/cd_books.html [Accessed on May 2, 2013]. A total of 25 books are listed at the site www.aboutdarwin.com.
- 49 Darwin, Charles (1859): *On the Origin of Species by Means of Natural Selection or The Preservation of Favoured Races in the Struggle for Life*. London: John Murray.
- 50 The physically strong with muscle power – often combined with money power – tend to weaken the fabric of values and value systems. The survival of the fittest must not mean the demise of ethical values and moral sentiments.
- 51 Based on <http://www.fordham.edu/halsall/mod/spencer-darwin.html> [Accessed on June 9, 2013].
- 52 Herbert Spencer (April 1857), Progress: Its Law and Causes, *The Westminster Review*, 67, 445–465.

3 Human evolution

Beyond the physical

3.1 Introduction

In an excellent article comprising an integration of the ideas of Darwin, Hayek and Boulding, Marmefelt (2009) begins by noting that for most in the field of social sciences, “the label Darwinian often means a biological explanation of social phenomena” (p.62). For instance, evolutionary psychology treats the evolution of the brain as the result of natural selection. Hayek and Boulding point to the evolution of culture in terms of learning, setting and observing man-made rules for evolution to proceed in an orderly fashion. The humans have evolved from actions based on instincts to actions subject to socially accepted norms and rules. This social or societal evolution is not the same as biological evolution. In that sense, it is evolution beyond the physical.

There is more to the human beings than flesh and bone. It may well be that the faculty of ‘complex thinking’ distinguishes the human from the rest of creation, despite the fact that thinking in rudimentary form has prevailed in other species.

The Google Answers site lists various sources and their count on the number of thoughts per day per average human being.¹ The range is 12,000 to 70,000 thoughts per day. Thinking, a key feature of the humans, is a primary ability that has helped in developing a whole host of other capabilities, two of the important ones being spoken and written communication, and continuous invention and innovation.

This chapter is about ideas on evolution beyond the physical. The topics covered include evolution of thinking, evolution of societies and cultures, and political and economic evolution. The chapter ends with a short section on evolutionary synthesis.

3.2 Evolution of thinking

As pointed out by Ruse (2009, p.10), Darwin in the *Origin of Species* says little about the evolution of the human beings, except for the assertion on the evolution of humans in the natural world. In the *Decent of Man*, he went further and said that thinking has an evolutionary origin just like the case of physical

nature. Animals possess some power of reasoning: pause, deliberate and resolve. Hence, man need not be kept wholly distinct from the rest in regard to natural evolution.

The Thinking Ape by Byrne (1995)² is a book aimed at discovering how human ancestors *reached* the point in cognitive evolution from which the development of modern humans was possible. As noted by Anthony Campbell³ in his review (of November 18, 2009), much of the book is on learning and imitation in chimpanzees and gorillas and implications for their intelligence. Once it is established that some animals are endowed with intelligence, at least the minimally needed capability to look for food and other items in the survival kit, it would appear as though intelligence had evolved over time.⁴

A relatively more comprehensive commentary is provided by Mark Lake in his review article (Lake, 1996). Lake, in the concluding part of his review article (Lake, 1996, p.314) makes the following comments:

The thinking ape described by Byrne is the starting point for human cognitive evolution . . . it remains true that Byrne has told us more about the intelligence of the great ape/human ancestor than we could hope to learn from the fossil record. . . .

3.3 Behind the evolution of the *humane*⁵

The Centre for Academic Research and Training in Anthropogeny (CARTA) organized a symposium on *Domestication and Human Evolution* in October 2014. The symposium site⁶ has the following in the short note of introduction: “The domestication of other species has played an undeniably central role in the evolution of modern humans. . . .” The symposium covered the domestication of a wide variety of species with inferences and implications for the humans.⁷

One of the symposium papers/presentations was by Robert Franciscus (Craniofacial Feminization in Canine and Human Evolution). An important observation was the following:

A promising model for the advent of facial diminution argues that anatomically modern humans represent a ‘self-domesticated’ species . . . producing . . . reduced aggressiveness. A higher level of social tolerance was likely a necessary prerequisite to increased human population densities, and/or extended cooperative social networks. . . .

(From the paper abstract available on the symposium site)

Richard Wrangham, in his symposium paper (Did *Homo sapiens* Self-Domesticate?), confirms some of the findings of Franciscus, notes that self-domestication refers to the evolution of a reduced propensity for reactive aggression, and concludes that “humans indeed self-domesticated, providing a critical underpinning for inter-individual tolerance and cooperation” (from the paper abstract available on the symposium site).

3.4 Social and cultural evolution

Wuketits and Antweiler (2004), in their *Handbook of Evolution, Volume 1: The Evolution of Human Societies and Cultures*, provide an array of views on the subject. In the preface, they note that the aim of the book is “to inform about the current theories, problems, and results of evolutionary thinking in different disciplines, and . . . to show some close connections and interrelations. . . .” A key message they provide is that evolutionary theory is not a ‘finished case’. The following short paragraphs provide some of the key contributions and selected ideas enshrined in them.

Michael Tomasello (2004) aims to show that human beings are biologically adapted for culture in ways that other primates are not.⁸ Evidence is seen in the fact that only human cultural traditions accumulate modifications over historical time.⁹

Olaf Diettrich (2004) makes the important point that humans, when confronted with physical problems, rely exclusively on external solutions, instead of waiting for evolution to provide better adaptation.

The comprehensive essay by Harold Haarmann (2004) deals with language evolution¹⁰ and related aspects. Peter Meyer (2004) notes that war and conflict played a major role in the evolution of societies and cultures.¹¹ Two key points are noted in summary: there are similarities in social evolution despite several differences between people located at far parts of the globe; and the similarities are in part due to common biological heritage and environmental conditions.

While on social evolution, mention must be made of some very important points from *The Selfish Gene* by Richard Dawkins (1976). According to the book summary by Sebastian Molnar brought out in 1998,¹² a contention of Dawkins was that individual organisms are designed by selfish genes to preserve them. Behind the selfishness of the gene, there is no thought process and its action is automatic. We should expect selfishness in human nature, but must “teach generosity and altruism” (p.3). “Genes are the primary-policy makers; brains are the executives” (p.60). Dawkins indicates that brains have evolved to take control of the body, even in opposition to the inherent selfish tendencies of replicators. Also, human social organization arises primarily through non-genetic, or cultural, means.

Camilo J. Cela-Conde and Francisco Ayala, in their *Evolution of Morality*, (pp. 171–190), right at the outset raise the question: can human moral behaviour be explained in terms of evolution by natural selection? Darwin in *The Descent of Man* alluded to many instances of animals helping those of their kind in distress.¹³ However, the enormity and complexity of moral and ethical codes, as well as the endless discussions and discourses on them, are truly human creations. Natural selection has been made possible by ever-increasing adaptations to the changing environment. However, natural selection cannot explain altruistic behaviour, which in many ways is contrary to selfishness.¹⁴ Genes, too, cannot explain such behaviour,¹⁵ nor can the fact that the humans have a brain.¹⁶

What aspect or novel process of evolution can explain the legendary figures such as Mahatma Gandhi, Martin Luther and Mother Theresa? They seem to fit the idea of ‘evolutionary outsiders’, introduced in 1998 by David Loye (2009):¹⁷ those who “boldly scout on ahead of us to explore potentially revolutionary as well as evolutionary prospects for a better future”. Loye also alludes to the 1977 publication *The Spectrum of Consciousness*, in which its author Ken Wilber poses the question “Are the mystics and sages insane?” and opines that perhaps “the evolutionary sequence really is from matter to body to mind to soul to spirit”.

3.5 Evolution of political order

The Wuketits and Antweiler (2004) volume has an essay on the evolution of politics by Peter Corning.¹⁸ The following is the concluding statement: “Politics is not simply an artefact of competing self-interests but a vitally important functional aspect of the on-going collective survival enterprise that has sustained us and our ancestors literally for millions of years” (p.239).

The Origins of Political Order by Fukuyama (2011) received a lot of acclaim and critical reviews. In May 2013, the distinguished scholar from Stanford gave a lecture on the same theme at the University of Cape Town (Fukuyama, 2013). “I am going to talk about where political institutions come from” was his opening statement in the lecture.

Political order comprises the state, law and accountability. These are succinctly dealt with in the lecture. In its original form, the state was nothing but authoritarian and patrimonial. It evolved to become the modern state based on ‘equality of all citizenry’. This development meant a negation of the normal human tendency of favouring one’s kith and kin, and also the tendency of returning favours.¹⁹ In the state arena, the development implies, for instance, moving out of appointing one’s relations to top government jobs and going for recruitments based on education and merit. Fukuyama points out that the transition was made very early in China.

“The state is about concentrating power and using it. The rule of law and institutions of accountability are about limiting power, about constraining power” (p.9). After noting this, Fukuyama addresses the issue of the origin of the rule of law. The answer is religion. Ancient Israel, Christian West, the Muslim world and Hindu India illustrate the point. China is the exception since it “never really had a transcendental religion” (p.10).

The third and final component in the evolution of political order is the evolution of democratic institutions providing for accountability. How did they come about? Fukuyama says: “I would suggest that the answer is virtually an historical accident. . . .” (p.13). The parliament evolved out of the need to raise taxes and is seen as a body representing taxpayers. As a corollary, resource-rich nations that do not tax their people can continue without anything like a parliament.

In his 2014 book, *Political Order and Political Decay: From the Industrial Revolution to the Globalization of Democracy*, Fukuyama points to liberal

democracy as a regime that is balanced among state, law and accountability. As pointed out by Narendar Pani in his review of Fukuyama (2014),²⁰ the central question posed is “whether liberal democracy . . . is a political universal or just a cultural preference of those who live in Western liberal democracies”. In the Darwinian sense of the ability to adapt to the changing environment and survive, liberal democracy is seen to fit in. People will make the system work.²¹

“Democracy as a Universal Value” was the title of a paper by Nobel Laureate Amartya Sen (1999). The paper (p.3) begins with: “In the summer of 1997, I was asked by a leading Japanese newspaper what I thought was the most important thing that had happened in the twentieth century”. Several major events were noted: the end of European empires; the two World Wars; the rise and fall of fascism, Nazism and communism; transformation in China; and the emergence of Asian economies. And then Professor Sen notes: “. . . among the great variety of developments . . . the preeminent development of the period: the rise of democracy” (ibid).

3.6 Economic evolution

The complex literature on the subject was competently summarized and commented upon by John Gowdy (2004).²² For most of human history, that is, for some two million years, hunter-gatherers had simple economies with simple technologies. Change began with the widespread adoption of agriculture that began about 10,000 years ago.

The shift from agriculture to industry was the most recent – just about 250 years old. Human population growth during the two and a half centuries was phenomenal: from about a billion to over 6 billion. The evolution of the market economy had contributed to such problems as inequalities in incomes and wealth on the one hand, and biodiversity loss and global climate change on the other, while providing enhanced ‘living standards’ for vast populations across continents. If the Industrial Revolution was the second divide, we are now witnessing the third divide propelled by the Communication Revolution, which has resulted in the culture of globalization.²³

The idea of the economic man (*Homo economicus*) working under the law of insatiability of wants (leading to entrenched greed) has taken hold of the West and is now taking deeper and deeper roots in most developing countries, including former communist and socialist nations. Despite this natural tendency of the economic man, also seen is an increasing tendency for cooperation and collaboration for common good. Yet, one might opine that few would join a group for the pure love of cooperation and compassion. While some may join for networking with like-minded people, others might see possible private gain by being part of organizations with laudable social and philanthropic objectives and accomplishments.

Going beyond *Homo economicus* and total allegiance to rational choice, humans may in fact be making consumption decisions because of the influence exerted

by social networks and information supplied by them (McFadden, 2013). Economic rationality is thus not the only factor that provides the basis for choices. Simple examples illustrate this. A person values his or her own possessions well above the market prices. Here it may be the sentiment that has its sway. Cognitive science also notes that one might dislike losing something much more than gaining the equivalent.

3.7 Evolutionary synthesis

Smocovitis (2012)²⁴ argued that the evolutionary synthesis or Neo-Darwinism “was, in short, supposed to offer one coherent universalizing and unifying narrative of life’s origins encompassing all life on earth and indeed elsewhere in the universe. . . .” (pp. 108–109). The underlying processes for evolution “were one and the same no matter what the level of selection might be: gene, individual, population, species. . . .” (p.112).

Smocovitis credits Theodosius Dobzhansky as a key figure in building the bridge between genetics and natural selection on the one hand, and the continuum between micro and macro evolution on the other. Based on Dobzhansky’s 1937 publication (*Genetics and the Origin of Species*), the following is asserted: “The gene had been constructed to particularize and individuate and at the same time to limit the rate of change, while mutations were made to be the determinants of evolutionary change” (p.112). Smocovitis notes further that Dobzhansky questioned ‘genetic determinism’. The implication is that the animal in man can be fought by the reasoning of his mind.²⁵

Smocovitis also alludes to the work of Julian Huxley, notably his 1942 book, *Evolution: The Modern Synthesis*, and says that he has recognized the co-existence of mechanistic materialism of natural selection as well as the improvement and progress of the humans. They can modify their environment via inventions and technology. Smocovitis further adds that human beings have had the capability not only to “control their own development through conscious willful – and disciplined – use of intelligence”, but also “to generate human values. . . .”

There is no doubt that the evolution of *modern* ideas on evolution was shaped by values such as the fundamental equality of mankind despite superficial differences. For instance, Smocovitis points out that Dobzhansky defined race as a “tool for description, not of individuals, but of subdivisions of species” (p.114). Refinements did not end. Ashley Montagu suggested the term ‘ethnic group’ in place of race, published in 1942 in *Man’s Most Dangerous Myth: The Fallacy of Race*, and argued that race was a social construct aimed at subordinating some groups.

One should think that the deep-rooted Indian caste system too began as an economically beneficial occupational categorization that was certainly desirable as long as it did not result in gross inequalities in the standards of living. Clearly, the expansion of good education across the entire population would lead to a reworking of the system, slowly approaching towards what one sees

in a maturing liberal democracy: meritocracy combined with addressing the minimum needs requirements of those that could not make it on their own. Sad to say, schools that bring together all income groups and one common national exam at the end of Grade 12, etc., are a far cry from ground reality: there are private schools, examinations and entrance tests galore in the present-day Modern India.

3.8 Evolution of science

Erhard Oeser (2004) says that, in regard to the evolution of the scientific method, there are two components: common sense-based knowledge, and science itself. The following are some of the main points made by Oeser (pp. 299–331) in his long, brilliant and thought-provoking exposition on the evolution of scientific knowledge.²⁶

First, the struggle for survival continues – for instance, the educated are favoured now. Second, common sense-based knowledge helped in survival, but scientific knowledge does more. Third, unlike man being moulded by nature, science is helping the discovery of the means to mould nature. Fourth, while common sense may not be independent of the observer, science is. Finally, the development of science is characterized by three phases: the pre-theoretical merely descriptive, theory constructions, and prediction and explanation of individual phenomena.

A more down-to-earth statement on the evolution of science is also worth noting. On June 30, 2009, Peter C Doherty, 1996 Nobel Prize Winner in Medicine, gave a lecture at the National University of Singapore on the topic “Living in an Evidence Based World”. Based on this writer’s notes, given below are some excerpts from the lecture:

Humans, some 120,000 years old, did not investigate about the happenings around them. The knowledge accumulated up until the start of the fourteenth century could not help prevent the ignorance that ruled at the time of the outbreak of the 1348–1350 plague, which wiped out 1.5 million people, or a third of the population of England.

The manifestations of ignorance were killing people ‘for poisoning wells’ or burying or drowning for practice of ‘witchcraft’. *The cause behind the ignorance was the lack of development of a general theory of infectious diseases.*

About 500 years ago, Western science began to emerge from the dark ages. However, serious science was suppressed if its findings were in conflict with the teachings of the Church.

From the sixteenth century, things began to change with the philosophy of Francis Bacon (1561–1626): draw knowledge from nature. The Royal Society was set up in the 1660s, and Lincoln established the US National Academy of Science. *There has never been a turning back. There is no nation on earth today that would neglect or negate science.*

3.9 God factor and science

In the historical past, there was fear among scientists in regard to publicizing their ideas. The widely known case is that of René Descartes, who in the seventeenth century did not dare publish his work on scientific methods “due to the fear that they would ascribe too much decision power to the mind of human individuals – and thus imply a loss of omnipotence of God and a consequent revenge on his earthly representatives” (Hanappi, 2008, p.276). We now see some reversal – that which prompts man to accept science and move away from the God Delusion.²⁷

What could be the answer to the question about why an idea strikes some and escapes the attention of many? From times immemorial, apples fell on earth. It was left to Newton to think of the force of gravity. Is it that his brain had some special ingredients that significantly differed from the then-average brain? Maybe there is some unseen force that decides what must happen when?

3.10 An end note

“. . . [T]he story of human evolution changes with each chance discovery” observed Lake (1996, p.314). It is certainly not a lab-tested story (theory). Fortunately for all humanity, there is not much of an implication for the way they live and let live. This may hold even if one day it is found with certainty that all creation had come at one go, some perished and some persisted, but all will end at the next big bang.

Notes

- 1 <http://answers.google.com/answers/threadview/id/149262.html> [Accessed on December 10, 2014].
- 2 Richard Byrne, Department of Psychology, University of St Andrews.
- 3 <http://www.acampbell.org.uk/bookreviews/r/byrne.html> [Accessed on December 15, 2004].
- 4 David Geary (2004), in his path-breaking book, argues that the ultimate focus of all the facets of the development of the brain and its activities is to support the humans’ attempts to gain access to and control of resources: social (e.g., mates), biological (e.g., food) and physical (e.g., territory) resources that supported successful survival and reproduction over time.
- 5 Meaning: characterized by kindness, mercy or compassion; marked by an emphasis on humanistic values and concerns (<http://www.thefreedictionary.com/> [Accessed on December 12, 2014]).
- 6 <http://carta.anthropogeny.org/events/domestication-and-human-evolution> [Accessed on December 12, 2014].
- 7 The eight distinguished speakers (and the titles of their presentations) were as follows: Robert Wayne, University of California, Los Angeles (The Transformation of Wolf to Dog: History, Traits, and Genetics); Anna Kukekova, University of Illinois at Urbana-Champaign (Fox Domestication and Genetics of Complex Behaviors); Robert Franciscus, University of Iowa (Craniofacial Feminization in Canine and Human Evolution); Terrence Deacon, University of California, Berkeley (The Domesticated Brain); Philipp Khaitovich, Chinese Academy of

Sciences–Max-Planck-Gesellschaft (CAS–MPG) Partner Institute for Computational Biology (Neoteny Gene Expression in the Developing Human Brain); Tecumseh Fitch, University of Vienna (The Domestication Syndrome and Neural Crest Cells: A Unifying Hypothesis); Kazuo Okanoya, The University of Tokyo (Domestication and Vocal Behavior in Finches); and Richard Wrangham, Harvard University (Did *Homo sapiens* Self-Domesticate?). For an elegant summary of the proceedings, see Gibbons (2014).

- 8 Mesoudi, Whiten and Laland (2004) affirm that the evolution of culture followed the Darwinian track and exhibited “variation, competition, inheritance, and the accumulation of successive cultural modifications over time” (p.1).
- 9 A slightly different view was expressed by Poiriot (2008, p.408): culture enables humans to further their survival.
- 10 Languages and dialects played a key role in human evolution. As pointed out by Nowak and Krakauer (1999), grammar may be seen as a set of rules to help communication. Behind the evolution of grammar, too, has been the process of natural selection.
- 11 Thorstein Veblen (quoted in Poiriot, 2008, p.411) refers to social evolution as a process of constant adjustment of social institutions to the needs of material provisioning. However, many institutions in Veblen’s view were not serviceable to human needs because they reinforced vested interests and blocked the full application.
- 12 http://www.oocities.org/we_evolve/Human_Nature/dawkins.html [Accessed on June 19, 2013].
- 13 Even these days, it is not uncommon to watch such instances. Indian TV channels and print media on December 22, 2014, publicized the case of a small monkey lying helplessly on the railway track when another tried to help and succeeded.
- 14 The fact is that the altruistic individuals are fewer in any society while the ‘selfish’ numbers dominate. Hay (2009), commenting on Warneken and Tomasello (2009), points out that selective pressures on human evolution could lead to aggression or altruism, depending on the context and nature of the rearing environment.
- 15 From Darlington (1978, p.389): “Is altruism in human beings genetically determined? I think it is and is not. A man is a man and behaves as one because of his genes. However, no specific ‘genes for altruism’ have been found in humans”
- 16 “. . . simple consciousness need not be an enduring entity but may merely exist from moment to moment according to the activities of the cerebral cortex. . . . This hypothesis for the origin of consciousness does not account, however, for the highest levels of consciousness in *Homo sapiens* . . . self-consciousness – which is the unique experience of each human self” (Eccles, p.7323).
- 17 David Loye (2009), The Evolutionary Outrider, *Integral Leadership Review*, August. Available at <http://www.integralleadershipreview.com/archives/2009-08/2009-08-article-loye.php> [Accessed on February 20, 2013].
- 18 *The Evolution of Politics*, pp. 191–252.
- 19 As stated in the Fukuyama lecture (p.5), Kin Selection or Inclusive Fitness, developed by William Hamilton, “says that we are altruistic towards other creatures in proportion to the number of genes that we share”. This beautiful idea explains the close relationship of parents and their children. “It is a principle of nepotism” (ibid). Then there is what biologists call *reciprocal altruism*: “exchange of gifts on a face-to-face basis” (ibid).
- 20 *The Hindu*, December 23, 2014.
- 21 On September 8, 1994, the then Prime Minister of India, Sri P V Narasimha Rao, delivered the Singapore Lecture at Singapore. To one of the questions, the

Prime Minister responded that the answer to all the ills of freedom is more freedom, not less.

- 22 Gowdy, John M., *Evolution of Economics*, in Wuketits and Antweiler (2004), pp. 253–298. See also Burd (2010).
- 23 The writer, since his childhood to present, witnessed the following changes, not quite imagined beforehand: from non-air-conditioned (AC) trains with no sleeping berths to those with AC and cushioned sleeping berths; from the (FACIT brand) calculators that took an hour or more to compute a regression equation to modern computers; from propeller planes that took three hours to cover 800 km to jets that take just an hour; from dial-up phones that took a day or more for international calls to materialize, to the mobile phones with instant connectivity; from black and white movies with no sound to exciting digital and high-definition movies; and the list can go on.
- 24 Smocovitis, Vassiliki Betty (April 2012), Humanizing Evolution: Anthropology, the Evolutionary Synthesis, and the Prehistory of Biological Anthropology, 1927–1962, *Current Anthropology*, 53(5), 108–125.
- 25 The reasoning is behind group and cooperative behaviour of humans. Bowles and Gintis (2011) expound the idea that *Homo sapiens* is a cooperating species. Of note, however, is a very important point noted in the review of the Bowles-Gintis work by Guth (2011): thinking of genocides, e.g. in the form of building concentration camps to murder millions of people, should make it clear that ‘cooperative’ is a rather neutral quality – we often ‘cooperate’ in doing good as well as in causing harm.
- 26 The essay by Oeser has numerous references to a number of scientists and thinkers who have contributed to the evolution of scientific thought. This summary, with due apology, eschews listing the names and the works (in the references provided at the end) unless they are explicitly consulted by this writer.
- 27 Chapter 6 will briefly cover *The God Delusion*, the beautiful book by Richard Dawkins (2006).

Part II

Economic progress



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4 Population growth and economic progress

Pre-industrial through the 1940s

A key dimension of human progress in general, and economic progress in particular, over the last several centuries has been the phenomenal increase in population. As Livi-Bacci (2012) noted on page 1 of his seminal book on the history of world population, “Throughout human history population has been synonymous with prosperity, stability, and security. A valley or plain teeming with houses, farms, and villages has always been a sign of well-being”.

This chapter will first trace the pace of demographic change and juxtapose it against economic progress.

4.1 Population growth: guestimates and estimates

Carl Haub (2011, update)

Carl Haub, Senior Visiting Scholar at the Population Reference Bureau, made longer-term estimates for world population in his article¹ titled *How Many People Have Ever Lived on Earth?* There are absolutely no demographic data for “99 per cent of the span of the human stay on Earth”. By implication, estimates for the relatively remote past must go as speculations and guesses.

The idea that modern *Homo sapiens* might have appeared around 50,000 BC was from *Determinants and Consequences of Population Trends*, revised edition, published by the United Nations (1973). Starting with two people living in 50,000 BC, the world population escalated to 5 million in 8000 BC, at the dawn of agriculture, and 300 million in 1 AD. The growth over 80 centuries was very slow, at an average annual rate of some 0.05 percent. Famines on the one hand, and threats from wild animals and climatic conditions on the other, must have made it impossible for humans to live long.²

From the 300 million people in 1 AD, the population grew to 500 million in 1650. This is by no means a better performance compared to the earlier era. The average annual growth rate was relatively less at 0.03 percent. Plague, the dreaded disease for centuries, was one key factor behind the low rate of growth.

Thanks to the advances in medical science and general living standards, the rise was steep after 1650: 795 million by 1750; 1,265 million by 1850; and 2,516 million by 1950, giving average growth rates of 0.5 percent, 0.5 percent

and 0.7 percent, respectively. In mid-2011, the world’s inhabitants numbered a whopping 6,987 million, and the average annual growth rate for the latest six decades was the historically high 1.9 percent. With an estimate of 7,375 million people in 2016, the growth rate works out to a little less than 1.1 percent, indicating the impact of population control programs across most nations of the world.

David Lucas (2003, update)

The site of the School of Demography of the Australian National University is about the chapter by Lucas on World Population Growth as part of *Beginning Australian Population Studies*.³ The population of the world was around 2 billion in 1920, which had grown to 3 billion in 1960, 4 billion in 1975, 5 billion in 1987 and 6 billion in the year 2000. The following estimates were provided for 1650–2000.

The annual percentage rate of growth of population was a low 0.3 percent over 1650–1750, 0.5 percent over the next hundred years and 0.8 percent over 1850–1950. Since 1950, the growth rate was in excess of 1 percent: 1.8 to 2 percent during 1950–1980, 1.7 percent during 1980–1990 and 1.4 percent during 1990–2000.

The primary factor behind the rise of population in the 350 years was mortality decline. In Europe, death rates fell from around 30 to 10. The reduction happened largely due to agricultural and industrial growth, ensuring proper food and nutrition, clothing and hygiene. Mortality decline was faster in Japan and Eastern Europe, and later (that is, since the end of the Second World War) in the developing world at large. Public health initiatives on a large scale, and the eradication of the dreaded diseases such as small pox and malaria, contributed to the decline in mortality in the developing world.

An important facet of population growth since 1800 was the growth of urbanization. The estimated urban population in 1800 was about 25 million, accounting for 2 percent of the world population. Thanks to the co-movement of industrialization and urbanization, the nineteenth and twentieth centuries witnessed rapid urbanization: by the year 2000, some 47 percent of the world population lived in urban areas.

US Census Bureau compilation⁴

The US Census Bureau compilation given in Table 4.2 is based on the estimates from the following sources: Biraben (1980), Durand (1974), Haub (1995),

Table 4.1 World population (from Lucas, 2003 update)

<i>Year</i>	<i>1650</i>	<i>1750</i>	<i>1850</i>	<i>1950</i>	<i>1990</i>	<i>2000</i>
Population (millions)	545	728	1171	2519	5255	6057

Table 4.2 Historical population estimates (in millions) from the US Census Bureau for selected years

<i>Year</i>	<i>Lower</i>	<i>Upper</i>	<i>Year</i>	<i>Lower</i>	<i>Upper</i>
10,000 BC	1	10	1000 AD	254	345
4000 BC	7		1200 AD	360	450
3000 BC	14		1250 AD	400	416
2000 BC	27		1300 AD	360	432
1000 BC	50		1400 AD	350	374
200 BC	150	231	1650 AD	470	545
1 AD	170	400	1750 AD	629	961
200 AD	190	256	1850 AD	1,128	1,402
500 AD	190	206	1950 AD	2,400	2,558

McEvedy and Jones (1978), Thomlinson (1975) and United Nations (1973 and 1999).

A comparison with the Lucas estimates shows that for 1650, the estimate (545 million people) is identical, while for other years, they are between the lower and upper estimates. Table 4.2 brings home the point that there were times in the historical past when population growth was either nil (comparing 200 AD and 500 AD) or negative (1250–1400).

Maddison estimates

Professor Angus Maddison compiled historical data on various demographic and economic variables.⁵ Table 4.3 shows the Maddison estimates of population from AD 1 through 2009. The world added just about 40 million people in the first thousand years with an annual average addition of just 0.04 million people. The statistic moved as follows in the next thousand years: 0.48 million in the next 700 years (1000–1700); 4.8 million (a tenfold increase from the earlier era) during the next 200 years (1700–1900); 19.3 million during the next 50 years (1900–1950); and 71 million in the next half century (1950–2000). The rate accelerated still further to 76.4 million per annum during the first decade of the present century. It is clear that a lot has happened in regard to life preservation in the eighteenth, nineteenth and twentieth centuries.

Behind demographic evolution

Over the millennia, humans struggled and learnt how to survive. As Max Roser (2015) succinctly portrays in an online graph, life expectancy was just around 28 years in England in 1731 and 25 in France in 1745, just as it was 29 in Italy and 25 in India in 1800. Much has been accomplished in the nineteenth

Table 4.3 Maddison estimates of population

Year	Population (millions)	Average annual growth %	Percentage of World Population in				
			Asia	Africa	Latin America	Australia, Canada, New Zealand, US	Europe
1	226		74.6	7.5	2.5	0.5	14.9
1000	267	0.017	68.3	12.1	4.3	0.7	14.6
1600	556	0.122	68.1	9.9	1.5	0.4	20.1
1700	603	0.082	66.6	10.1	2.0	0.3	21.0
1900	1,563	0.476	55.8	7.0	4.1	5.5	27.6
1950	2,528	0.961	54.8	9.0	6.5	7.0	22.7
2000	6,076	1.754	59.3	13.3	8.6	5.5	13.3
2009	6,764	1.191	59.4	14.6	8.6	5.4	12.0

and twentieth centuries: life expectancy in 2011 was a healthy 65 years in India and a whopping 83 in Japan, with several of the other nations falling in between (Russia 69, Bangladesh 70, Brazil 74, China 76, Cuba 78, USA 79, England 80 and France 82).

There is a close correlation between infant mortality and life expectancy, with 20 to 30 out of 100 children dying before age one in the early part of the nineteenth century in the present-day industrialized countries, versus the vastly different present position of just about less than one child dying out of 100.

It is well known that high mortality and high fertility go hand in hand. If mortality decline happens over a relatively long period, and if the phenomenon is felt firmly by one or two generations, then the stage is set for fertility decline. Based on the French experience of mortality during 1740–1790, when life expectancy was around 25–28 years, Livi-Bacci (2007, p.105) estimated that there was a one in four chance of a 40-year-old mother being a witness to the demise of her ten-year-old son. One can well extrapolate how important it was, then, for each mother to do what she could to ensure at least one child would survive.⁶ The present state of low mortality has ‘almost’ ruled out the fear of mothers living and children dying, though the situation still might be somewhat alarming in low-income segments of developing countries in Africa and parts of Asia.

The data in Table 4.4 are broadly indicative of fertility trends in selected industrial and developing countries. The convergence towards a two-child average appears to be the norm. As families felt that children survived – that is, as ‘demographic waste’ was minimized (Livi-Bacci, 2007, pp. 98–99) – the convergence to a small family norm had been greatly facilitated.

Table 4.4 Trends in average annual total fertility rates

<i>Period</i>	<i>1800–1849</i>	<i>1850–1899</i>	<i>1900–1949</i>	<i>1950–1999</i>	<i>2000–2012</i>
Finland	4.7	4.8	3.5	2.1	1.8
Germany	5.1	5.1	2.2	1.8	1.4
Netherlands	5	5	3.4	2.2	1.7
Norway	4.4	4.5	2.9	2.2	1.9
Russia	6.7	6.7	5.6	2.1	1.4
Spain		4.8	3.4	2.2	1.4
Sweden	4.6	4.3	2.7	2	1.8
United Kingdom	6.2	4.8	2.3	2.1	1.8
United States	6.6	5	2.9	2.5	2
India		5.8	5.8	4.9	2.8
Indonesia		6.1	5.8	4.6	2.5
Iran			7.1	5.9	1.9
Japan	4.3	4.1	4.7	2	1.3
Brazil		6.2	5.8	4.5	2
Argentina		6.5	4.5	3.1	2.3
Chile	6	5.3	5.6	3.7	1.9
North Korea			6.1	3.3	2
South Korea			5.9	3.6	1.2
New Zealand		4.8	3.1	2.7	2

Source: based on the annual data in Max Roser (2015)

On the issue of mortality reduction, Livi-Bacci (2007, p.107) provides interesting data showing the contributing factors for an increase in life expectancy in the twentieth century relative to the nineteenth century. In England, life expectancy rose from 40.8 years in 1871 to 68.4 in 1951 – a gain of 27.6 years over eight decades. The control of infectious diseases contributed 43 percent to that increase, while the control and treatment of other diseases had shares of 3.6 percent or less. Life expectancy gains continued in each and every country. In England, for instance, life expectancy in 2012 was almost 80 years.⁷ For the world as a whole, the estimate was 70 years.

Past and future

Based on accumulated knowledge and expert research, the United Nations brought out a 1999 publication titled *The World at Six Billion*. The following statistics are noteworthy. It was in 1804 that the world population reached the billion mark, up from 0.31 billion in the year 1000. While it took some 1,800 years for the world population to reach a billion, the next billion was added in

Table 4.5 Countries making up about half the world population, 2015, 2050 and 2100 (based on UN, 2015)

2015		2050		2100	
<i>Country</i>	<i>Population (millions)</i>	<i>Country</i>	<i>Population (millions)</i>	<i>Country</i>	<i>Population (millions)</i>
China	1,376	India	1,705	India	1,660
India	1,311	China	1,348	China	1,004
USA	322	Nigeria	399	Nigeria	752
Indonesia	257	USA	389	USA	450
Brazil	208	Indonesia	322	D R Congo	389
Pakistan	189	Pakistan	310	Pakistan	364
		Brazil	238	Indonesia	314
		Bangladesh	202	Tanzania	299
				Ethiopia	242
World	7,349	World	9,725	World	11,213

123 years (2 billion in 1927), while 1 more billion was added by 1960, or in 33 years. The momentum gathered, with the world population reaching 4 billion in 1974, 5 billion in 1987, 6 billion in 1999 and 7.3 billion in 2015.

Some 80 percent of the global populace live in developing countries. The median age of the world population rose from 23.5 years in 1950 to 26.4 in 1999 and 30 in 2015, with the prospect of it reaching 36 by 2050. The United Nations publication on *World Population Prospects* issued in 2015 provides projections for the future. Based on the medium variant of the projections, the population of 7.3 billion in 2015 would rise to 8.5 billion by 2030, 9.7 billion by 2050 and 11.2 billion by 2100 (Table 4.5).

4.2 Human development and economic growth

Population and development

Given that economic growth in the longer term depends on innovations in production (new goods and new processes) and distribution (online purchases delivered at home), it is only natural for one to think that population plays a secondary or background role in economic development, but this is only partially true. Just as high levels of infant mortality induced research into how to arrest it, population size and composition help a great deal in economic development. Fertility control and options in regard to the number of children one wishes to have coincide with the desire to give the best to the children – motivating educational expansion and innovations.

Nations with a small population can hardly induce investment and industrial development and higher standards of living. In contrast, *large population and right policies* offer the most fertile ground for achieving prosperity, as in the case of post-1978 China. It is not immediately clear how the future holds for nations with rapidly ageing populations.

Child survival experience as development indicator

By 1950, hardly a few years after the Second World War, peace and tranquility returned to most of the industrialized nations. Relatively low infant mortality rate (IMR) was realized by some of those nations during the period of 1950–1955, even though an average IMR of less than 20 was not recorded in any nation of the world (Table 4.6). A level in the range of 20–29 was achieved in Sweden, Iceland, Norway, Slovenia, Netherlands, Australia, New Zealand, Denmark, the UK and Switzerland. The USA, Finland and Canada had an IMR in the interval 30–39.

Ireland, Luxembourg, France, Greece, Belgium, Czech Republic and Germany had an IMR of 40 to 49, while Japan had a level of 50. Worse were the cases of Austria and Italy, with average IMR of 55 and 60, respectively. At the other end, at very high levels of IMR were India (164) and Pakistan (198), while the highest level of 350 was scored by Yemen.

Five and a half decades later, the IMR situation was substantially different. An excitingly lowest level of two per thousand births was registered in Iceland, Luxembourg, Singapore and Sweden. The above-100 level of IMR during 2005–2010 was the experience of just eight nations: Mali, Equatorial Guinea, Guinea-Bissau, Angola, Chad, Central African Republic, Democratic Republic of the Congo and Sierra Leone.

Table 4.6 189 countries' progress on IMR

<i>IMR Range</i>	<i>1950–1955</i>	<i>1970–1975</i>	<i>1990–1995</i>	<i>2005–2010</i>
Less than 20	None	19	65	96
20 to 39	14	34	37	32
40 to 59	13	38	26	24
60 to 79	20	14	22	19
80 to 99	23	15	13	10
100 to 129	28	35	18	8
130 to 159	33	23	6	None
160 to 199	29	11	1	None
200 and above	29	None	1	None
Total	189	189	189	189

Source: data from <https://esa.un.org/unpd/wpp/> (UN, 2015)

Just five and a half decades ago, in 1950–1955, the number of countries with above-100 IMR was a whopping 119, or two-thirds of the total of 189 nations. The phenomenal change in IMR is but a mirror reflection of what post-colonial nations have struggled to accomplish.

Professor North on economic performance

This section is based on the Nobel Prize lecture delivered by Professor North. The title of his lecture was *Economic Performance through Time*.⁸ Opening with the statement that economic history is about the performance of economies through time, Professor North moves on to point out that the challenge is to figure out “an analytical understanding of the way economies evolve through time”.

An important point he makes is that the neoclassical theory of free markets and minimal government has no intrinsic capability to design development policies since it had no discourse on how economies develop and no understanding of the role of institutions over time. In his view, political and economic institutions are the underlying determinant of economic performance. Time allows the learning process of human beings and shapes the way institutions evolve. Institutions are human constructs providing formal and informal constraints (rules, laws, constitutions, etc., are formal and norms of behaviour and conventions, and self-imposed codes of conduct are informal).

Professor North argues that rationality assumptions underlying economic theory assume that individuals know what is in their self-interest and act in tune with that interest. The assumption “is patently false in making choices under conditions of uncertainty. . . .”

Constant and continuous learning helps in shaping beliefs and institutions. Their evolution over time may or may not produce economic growth. Professor North explains this with reference to the evolution of primitive tribes over time: some were able to take advantage of specialization and division of labour and become economically advanced, while others mired in tradition could not.

Knowledge has been the basis for new products and processes and has been the driver of economic growth. The growth of knowledge and institutional evolution has been behind the development of Western Europe.

Fukuyama's Cape Town lecture

In his Cape Town lecture of 2013, Francis Fukuyama⁹ refers to the near-subsistence existence for some 40,000 years up until just about 1800, with per capita GDP of the major economies¹⁰ of the world remaining at that level. The world thus was caught in the Malthusian trap.¹¹ Fukuyama (p.18 of the lecture) summarizes the GDP trend up until the late eighteenth century thus:

It goes up a little during the era of the Roman Empire and then falls again. In the Middle Ages, China and Europe trade places at various points, and

all of a sudden in Europe GDP just starts shooting up, beginning in the early 19th Century, because of industrialization. . . .

Moving from present to past

Backward extrapolation helps to gain a long-range view. The Organization for Economic Cooperation and Development (OECD) in June 2013 released a set of long-term baseline projections for global GDP per capita in 2005 USD on a purchasing power parity (PPP) basis (Table 4.7A). The projections imply that global per-capita GDP is to increase by 3.4939, or roughly 3.5 times in the half-century from 2010 to 2060.

If every 60 years the same increase is applied, backward extrapolation [applying 3.4939 as the divider] gives the ‘estimates’ for global per-capita GDP for the historical past shown in Table 4.7B.

The numbers in Table 4.7B seem meaningless at the first glance. How could world population survive on 1 USD in 1610? But then the spirit of the projection is in sync with the Fukuyama observations, to some extent.

Maddison data and analysis

The late Professor Angus Maddison did pioneering work in estimating historical GDP numbers for the world as well as most of the nation states and explained long-term trends. In 2001, the Development Centre of OECD brought out his masterpiece, *The World Economy: A Millennial Perspective*. The data and

Table 4.7A Per-capita GDP in 2005 PPP USD

	2010	2015	2060
OECD	30,187	32,171	65,376
Brazil	10,105	11,149	32,086
China	6,804	9,946	48,403
India	2,970	3,734	27,552
Russia	14,125	16,894	45,588
South Africa	9,489	11,169	41,848
WORLD	12,608	14,448	44,051

Source: *Economic Outlook No. 93* – June 2013 – long-term baseline projections

Table 4.7B Global per-capita GDP for the historical past

2010	1960	1910	1860	1810	1760	1710	1660	1610
12610	3610	1030	300	90	25	7	2	1

analysis in the work refer to the period 1000 through 2000. The content is rich with a number of tables covering the world at large and its nation–state constituents.

Despite the fact that the Maddison work cannot be further summarized, a few of the salient points are noted as follows. Compared to the period from 1 AD through 1000 AD, when per-capita income stagnated at a relatively low level, it rose 22 times during the thousand years from 1000 AD through 2000 AD. By 1820, notes Maddison, the per-capita income of Western Europe, North America, Australia and Japan was twice that of the rest of the world. The Maddison book is nothing short of a detailed discourse on the history of economic development, with full reference to the economies that surged forward and those that lagged behind.

How does one explain the advance (increase in population and income) of a society? At the core is the acquisition of fertile areas and resources, either via conquest or settling down in an otherwise empty space. Cultivation of land, rearing livestock, fishing and forestry, mining, and allied activities are facilitated by such acquisition. Technological and institutional innovations have always played a key role as well; and further progress has been facilitated by international trade and capital movements.

Examples of the acquisition and exploitation of resources – based on relatively more detailed discussion by Maddison – are the following: Chinese advances on rice cultivation and the redistribution of population south of Yangtze; the discovery of the Americas by Columbus, and subsequent conquest of Mexico and Peru; gaining of knowledge on crops such as maize, potato, chilli, tomato and ground-nuts and their introduction in Europe, Africa and Asia; the introduction of wheat, rice, vines, olives, banana and coffee in the Americas; the importation of slave labour from Africa into America; European immigration into America and the introduction of railways; and the marginalization of indigenous populations.

While land acquisition was one factor in the demographic and economic advance of the global economy over the millennium, Maddison mentions two more: international trade and capital movements; and technological and institutional innovation. “International trade was important in the economic ascension of Western Europe, and much less significant in the history of Asia or Africa” (p.19). Trade across countries in Europe and Asia helped in the exchange of products as well as technologies. In all of these, Venice played the pivotal role, including developing institutions of higher education, finance and banking, and international relations. While Venice receded as the pivot, Portugal took over the role by the second half of the fifteenth century.

The slave trade, which began in Portugal, helped to provide a labour force for the industry in the New World. Developments in shipping and shipbuilding, combined with the promotion of free trade, either via colonization or pressurizing, had helped the progress of Europe and the Americas.

Technological and institutional innovation is the third and final factor governing the global growth process. Since 1820, technology has been playing a key role in growth. Most notably the Malthusian trap has been successfully tackled

by changes in agricultural technology. World economic advance was also aided by technological progress in transport and communications as well as in institutions of finance and commerce. There was also the significant development of scientific research and its dissemination.

The game ended with the two World Wars, the Great Depression in between, and the freedom movements in the colonies. As noted by Maddison (p.21), and as is well known, the world economy grew much more slowly between 1913 and 1950 compared to 1870–1913.¹² In fact, it is apt to designate the period 1870–1913 as *the golden age for the global economy*: “The present day industrialized countries . . . achieved economic growth never experienced before. . . . Simon Kuznets has estimated median growth rates of about 3 per cent per year in the total national output. . . .” (Rao, 1993, pp. 6–7).

The Industrial and Innovation Revolutions

The Industrial Revolution could well be defined as the compendium of growth and trade promoting improvements¹³ and innovations unveiled during the early eighteenth to the mid-twentieth centuries, first in Europe and then in America. Table 4.8A provides a sample of the innovations of the period 1712–1869. It is fair to say that the burden on and the boredom of humans has been reduced significantly by many machines, ranging from the flying shuttle and spinning jenny to the sewing machine and dishwasher.

Table 4.8A Selected major inventions 1712–1869¹⁴

1712–1870			
Year	Invention	Year	Invention
1712	Atmospheric steam engine	1830	Sewing machine
1733	Flying shuttle	1831	Electric dynamo
1764	Spinning jenny	1835	Mechanical calculator
1769	Steam engine	1836	Propeller, Revolver
1774	Electric telegraph	1837	Telegraph
1775	Steamship	1839	Rubber vulcanization, Bicycle
1776	Submarine	1850	Dishwasher
1786	Steamboat	1853	Manned glider
1797	Precision lathe	1854	Fiber optics
1799	Battery	1855	Rayon
1804	Steam-powered locomotive	1858	Rotary washing machine
1809	Electric light – first arc lamp	1858	Internal combustion machine
1814	Steam locomotive, Photograph	1862	Machine gun
1825	Electromagnet	1866	Dynamite, Torpedo
1829	Typewriter	1867	Modern typewriter

Table 4.8B Selected major inventions 1870–1945

1870–1942			
Year	Invention	Year	Invention
1876	Telephone, internal combustion engine	1930	Analog computer, Jet engine
1881	Roll film for cameras	1931	Electron microscope
1885	Automobile, Motorcycle	1932	Radio telescope
1895	Projected motion picture	1934	Tape recorder
1901	Radio receiver	1935	Nylon, Radar
1903	Gas-motored and manned airplane	1936	Revolver
1904	Tractor	1937	Photocopier
1907	Bakelite, Piloted helicopter	1938	Teflon
1916	Radio tuners, Stainless steel	1939	Sikorsky helicopter
1921	Robot	1941	Computer software, Reactor
1927	Electronic TV system	1945	Memory storage

The pace of innovation changed during the second phase of the Industrial Revolution covering 1870–1914, which may be extended to 1945, the end of the Second World War and the beginning of the end of colonization. Since the 1870s, innovations were not merely boredom-reducing or physical fatigue minimizing aids: the key achievement of the new innovations was increased speed in travel and communication (Table 4.8B).

The second phase was also characterized by product improvements that had a salutary impact on the industrial and services sectors. Steel replacing iron and the computer replacing the mechanical or electrical calculator are examples. Steel was behind the now routinely seen skyscrapers, railroads, train coaches, industrial machinery and modern ships, apart from numerous other applications. The computer, on its part, was among the first steps taken to unveil the information technology revolution most vibrant since the second half of the twentieth century.

Another important development of the second phase was triggering the modern public distribution of electricity. Work was no longer limited to the day time, and the night shift was not seen as an aberration. Electrical energy replaced mechanical energy in several places just as the two, at different points in time, helped reduce the intense use of human energy. A simple example is the progress from manually moving water from a tank or well to a home to mechanically/ electrically accomplishing the same.

4.3 Next chapter: focus on post-war growth

The *Historical Statistics of the World Economy, 1–2008 AD* by the late Professor Maddison, available on the web,¹⁵ has information on the global GDP shares for the main regions of the world (see Table 4.9).

Table 4.9 World GDP and population distribution

Region	GDP Share %					Population Share %	
	1 AD	1700	1900	1950	2008	1 AD	2009
Western Europe, European offshoots, Eastern Europe and former USSR	17	29	65	70	45	15	17
Latin America	2	2	4	8	8	3	9
Asia	73	62	28	18	44	75	59
Africa	8	7	3	4	3	7	15
World	100	100	100	100	100	100	100

The two-millennia economic history of the world in capsule form could read as follows. In AD 1, the GDP and population shares of the four major regions were about the same. The dramatic development was, in fact, witnessed from around 1700, coinciding with colonization (and slavery) going in full swing, bringing the Western share in global GDP to an all-time high of 70 percent by 1950. The data do show the massive change that has taken place in the relative importance of the Asian economies within less than six decades. Africa, however, has a long way to go.

Decolonization began from the end of the two World Wars and a new era had begun in the world economy – the subject of discourse in the next chapter.

Notes

- 1 www.prb.org/Publications/Articles/2002/HowManyPeopleHaveEverLivedonEarth.aspx [Accessed on November 6, 2016].
- 2 Carl Haub conjecture: life expectancy at birth probably averaged only about ten years for most of human history.
- 3 <http://demography.anu.edu.au/sites/default/files/publications/beg-pop-tudies/BAPSCChap3.pdf> [Accessed on April 10, 2015].
- 4 https://www.census.gov/population/international/data/worldpop/table_history.php [Accessed on April 3, 2015].
- 5 See Maddison (2001) and updates at <http://www.ggdcc.net/maddison/oriindex.htm> [Accessed on April 12, 2015].
- 6 A female marrying at age 20 could expect a reproductive life span of 25 years (menopause at 45). If she was obliged to have children more or less continuously, with an average child spacing of 1.5 years, then she could be expected to have 16 or more pregnancies.
- 7 http://www.who.int/gho/mortality_burden_disease/life_tables/situation_trends/en/ [Accessed on April 27, 2015].
- 8 Based on the Prize Lecture delivered on December 9, 1993, by Professor Douglas C North, co-winner of the 1993 Economics Nobel Prize, available at http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1993/north-lecture.html#not [Accessed on April 6, 2015].

- 9 Lecture on 'The Origins of Political Order', University of Cape Town: Graduate School of Development Policy and Practice (May 10, 2013).
- 10 Europe, China and the Americas.
- 11 Rates of population growth and food supply tend to be equal, and the per-capita food supply will thus remain constant at the subsistence level. When the per-capita food supply is above subsistence, the population increases and nullifies the gain.
- 12 In lectures on the world economy at the National University of Singapore in the late 1980s and early 1990s, the writer used to describe the period 1870–1913 as the golden age for global growth largely due to the high rate of growth of the Western world facilitated by the free flow of capital, labour and goods. There has been no such three-way free flow since then. The recent decades have seen large-scale efforts at promoting free trade and free capital flows, but not the free flow of people.
- 13 Among the trade-promoting developments were the replacement of the sailboat by the steamship, which reduced the shipping costs by more than a third. The reopening of the Suez Canal in 1869 brought Asia some 4,000 miles closer to Europe. In the European and American colonial settlements, the development of railroads helped in connecting the primary commodity-producing centers and the ports. All this, however, did not help the major Asian economies – China, India, Indonesia and the Philippines, inclusive.
- 14 Tables 4.8A and 4.8B are based on the exhaustive listing at <http://storiesofusa.com/industrial-revolution-inventions-timeline-1712-1942/> [Accessed on July 23, 2015].
- 15 <http://www.ggd.net/maddison/oriindex.htm> [Accessed on April 12, 2015].

5 Progress since 1950 and the emerging challenges

5.1 Colonies to free countries

Since the end of the Second World War, an important factor propelling economic growth across a wide geographical spectrum has been the emergence of a relatively large number of new nations, brought about by decolonization leading to political independence of former colonies (see Table 5.1). Almost all the new nations are in the category of developing economies and are in Asia, Africa and Latin America.

The post-Second World War era has seen a phenomenal shift in global attention towards fostering development in the relatively poor developing countries. Almost every initiative in the bilateral and multilateral arena has been moving towards the rapid economic and social development of the newly independent nations.

5.2 Economic growth

Development economists familiar with the low-level equilibrium trap (LET) understand fully well the enormity of the task of achieving sustained high growth rates in poor countries. In its simplest, LET is explained as follows. When a country's highest priority is to produce food crops or export crops, agricultural occupations dominate, farms are divided as population grows, subsistence farming becomes routine, food supply increases lead to population increases and the economy settles at an unchanging per-capita income (more or less). *That is the trap*. Saving is minimal and investment, too, is minimal. Economic growth matches population growth at best. *There is no way out of the trap unless it is attacked one way or the other*: some nations might restrict consumption and promote savings, while others might go in for inflow of investments from abroad. Neither is easy, but the world has indeed seen considerable success with such strategies in many nations, in Asia and elsewhere.

One may feel that large populations living within relatively small geographical areas will have little prospect of overcoming LET. Table 5.2 provides a way to check the economic accomplishments across different demographics of a large number of nations. Though one should not read too much into the data, the

Table 5.1 Countries by year of freedom

<i>Date of independence</i>	<i>Number of countries</i>
Before 1800	6
1800–1900	28
1900–1944	24
1945 onwards	115

Table 5.2 Nations by density and income per capita (K = thousand)

<i>Density (population/ sq. km.)</i>		<i>Per-capita income (2008–2010 average, USD)</i>							<i>Total</i>
		<i><1000</i>	<i>1K– 2K</i>	<i>2K– 5K</i>	<i>5K– 10K</i>	<i>10K– 20K</i>	<i>20K– 40K</i>	<i>>40K</i>	
2	10	2	2	3	4	2	1	3	17
10	20	2	6	7	0	3	0	3	21
20	40	7	1	1	1	5	1	3	19
40	60	7	4	2	8	1	0	0	22
60	80	6	3	10	1	1	1	1	23
Sub-total		Less than 5K total: 63			5K and above: 39				102
80	100	1	0	2	5	0	2	1	11
100	120	1	1	1	3	3	4	1	14
120	200	4	3	6	0	2	1	6	22
200	400	3	4	5	2	1	4	4	23
>	400	2			3	1	6	3	15
Sub-total		Less than 5K total: 33			5K and above: 52				85
<i>Total</i>		<i>35</i>	<i>24</i>	<i>37</i>	<i>27</i>	<i>19</i>	<i>20</i>	<i>25</i>	<i>187</i>

Sources of basic data: UN Population Division and World Development Indicators

notion that a large population stuck in a relatively small land area is a curse and a bane does not seem to be quite valid.

How could billions get out of LET? Colonization may be considered as the opening up of the underdeveloped economies. The colonizers upgraded the physical infrastructure and human capabilities of some of the natives, together helping the latter to taste economic progress as well as dreaming about freedom and self-governance. *The erstwhile colonies became independent nations, and their economic status progressed from underdeveloped to developing.* The story of that progress in capsule form is presented in the rest of this section.

That colonization had brought the taste of development to the colonized, which in turn must have served as the propeller of independence movements, may be illustrated with reference to India under the British rule. Some of the key timelines of the rule are noted in Box 5.1. Needless to stress, there was a lot that India gained from the English language and the Indian railway, most critically in uniting the country of hundreds of princely states – a comment once made by none other than Mr Lee Kuan Yew, the architect of modern Singapore.¹

Box 5.1 British India: selected timelines

1835: Macaulay's Education Resolution; English made official language
 1835: Foundation of Calcutta Medical College
 1848–1849: Opening of a Hindu Girls' School in Calcutta
 1853: Railway opened from Bombay to Thana
 1853: Telegraph line from Calcutta to Agra
 1856: Indian University Act; 1861: Archaeological Survey of India
 1865: Telegraphic communication with Europe

Post-1950 performance and economic distances

As Maddison (2001, p.22) notes, the 1950–1973 average annual growth rate of the world economy was close to 3 percent a year and “was a golden age of unparalleled prosperity”. A number of factors were behind the golden age. Of great importance was the unveiling of a liberal economic order, along with the birth and progress of institutions aimed at safeguarding the order as well as specifically assisting in the growth of the hitherto underdeveloped economies.² Just as the pursuit of economic and social development has become the main goal in the ex-colonial nations, growth propelled by technological progress has become the aim of the industrialized economies.

Table 5.3 tracks the economic distance between nations over the period since 1913. The bold numbers in the table refer to the regions that have improved their per-capita income levels in relation to the world average. The two principal groups showing considerable improvement in relative standing across the globe are: Western Europe on the one hand, and Australia, New Zealand, the USA and Canada on the other. This trend is in sharp contrast to the shares in world population: Europe's share declined from 21.7 percent in 1950 to 10.6 percent in 2010; and in the case of the four-country group, the share in the same time period declined from 7.2 percent to 5.3 percent.³ Asia and Africa had 60 percent and 16 percent of the world population, respectively, in 2015, but they have a long way to go in regard to moving close to the global average per-capita GDP.

Table 5.3 GDP per head: convergence and divergence (bold indicates relatively long spells of increase)

	1913	1950	1960	1970	1980	1990	2000	2008
World Average	1	1	1	1	1	1	1	1
Western Europe – 12 countries	2.4	2.4	2.7	2.9	3.1	3.3	3.3	2.9
Western Europe Total	2.3	2.1	2.5	2.7	2.9	3.1	3.2	2.8
Australia, New Zealand, USA and Canada	3.4	4.4	3.9	3.9	4.0	4.3	4.5	4
East Europe – 7 Countries	1.1	1.0	1.1	1.2	1.3	1.0	1.0	1.1
Total Former USSR	1.0	1.3	1.4	1.5	1.4	1.3	0.7	1
Total Latin America	1.0	1.2	1.1	1.1	1.2	1.0	1	0.9
China	0.4	0.2	0.2	0.2	0.2	0.4	0.6	0.9
India	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.4
Total 16 South and East Asian countries	0.4	0.3	0.3	0.4	0.4	0.5	0.6	0.7
Total 30 East Asian countries	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.3
West Asia – 15 countries	0.7	0.8	0.9	1.1	1.2	0.9	0.9	0.9
Total Asia	0.5	0.3	0.4	0.4	0.4	0.5	0.6	0.7
Total Africa	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2

Basic data are from the Maddison Project Data Base (<http://www.ggdc.net/>)

Case study: the US economy

The Economist of January 9, 2016, carried a review of the most recent work on US economic history by Gordon (2016). Gordon's book (*The Rise and Fall of American Growth*) underscores the technological revolutions of the nineteenth century that have transformed the lives of Americans. Electricity, telephone, automobile and various gadgets unleashed a whole new way of living. Surmounting the vagaries of the Great Depression, America emerged strong and powerful after the Second World War. *The Economist* (January 9, 2016) notes: "The 1950s and 1960s were a golden age of prosperity in which even people with no more than a high-school education could enjoy a steady job, a house in the suburbs and a safe retirement".

Has the golden age ended? Consider total productivity: against an annual average growth of 2.8 percent between 1920 and 1970, total productivity was down to 1.6 percent during 1970–2014. The picture is one of challenges with no visibly easy solutions: an ageing population, rising health care and education costs, and growing income inequality (more on this in the penultimate section of this chapter).

The data in Table 5.4 have a story to tell. The 1960s were great. The three following decades were not bad – information technology and related developments yielded an annual growth rate of 3.3 percent. The record for the next 15 years – an average annual growth rate of just about 2 percent – does not seem great.

Table 5.5 demonstrates the changing economic structure behind the 2000–2014 loss of the growth tempo of the past. The 1970s had a 40 percent service sector that may not be value-adding directly, but it had a supporting role to the rest of the total economy – the 60 percent part. In the most recent five years (2011–2014), it is the cart before the horse: services occupied 64 percent of the economy.

With services leading, one should expect a global competitive edge driving them, thus ensuring the phenomenal growth of exports of services balancing the overall trade account. The ground reality is far from such an expectation. United States Census Bureau data for 2010–2015 show an average annual services trade surplus of \$219 billion and a goods trade deficit of \$725 billion resulting in an overall trade deficit of \$506 billion. For the six-year period as a whole, the deficit was a little over \$3 trillion.

Table 5.4 US average annual GDP growth rates, 1970–2014

<i>Period</i>	<i>Average Annual GDP Growth Rate %</i>	<i>Period</i>	<i>Average Annual GDP Growth Rate %</i>
1970–79	3.24	2000–09	1.82
1980–89	3.15	2010–14	2.04
1990–99	3.23		

Summary: 3.2 annual growth for 1970–2000 and 2% for 2000–2014.

Source: <http://www.bea.gov> [Accessed on January 14, 2015].

Table 5.5 US GDP composition (percent), 1971–2014

(a more detailed table is in Appendix 5D)

<i>Broad groups of sectors</i>	<i>1971–1980</i>	<i>2011–2014</i>
Professional and personal services; finance, insurance, and real estate; government	<i>41.2</i>	<i>64.1</i>
Manufacturing, wholesale and retail trade, transport, communications, public utilities, construction, mining, agriculture, forestry, and fishing	<i>58.8</i>	<i>35.9</i>

Source: same as for Table 5.4

Tables A5.2 and A5.4 in Appendix 5D respectively list the prominent inventions of the two periods 1900–1950 and 1950–2010. Several major inventions have been behind the rapid industrial expansion and economic growth of the US and Europe during 1900–1950. The period 1950–1970 also witnessed the innovation culture attempting better products and processes.

The contrast is the information and media services inventions of 1971–2010. Consider clothing, for instance. One can buy dresses online; garment manufacturing strategies can be shared across the globe; and clothing import and export data can be downloaded by the click of a mouse. By these developments, have the Americans on average become much better off? This is an important question for which the answer does not seem to be affirmative.

United States Census Bureau data on poverty do not portray continuous decline: the poverty rate was 22.4 percent in 1959, the lowest rate was in 1973 at 11.1 percent, the next highest rate was 15.2 percent in 1983, and in 2015 the rate was 13.5 percent. In 2015, among the racial groups, the poverty rates (percent) were as follows: 9.1 among Whites (not Hispanic), 24.1 for Blacks, 21.4 for Hispanics and 11.4 for Asians. Perhaps all the developments in services sector did not mean much to the common man. Some Americans were enthused when Mr. Donald Trump, in his election speeches, promised to bring manufacturing jobs back home. He won the Presidential election on November 8, 2016.

5.3 Progress on life expectancy

There has been a sea change in the world demographics since the Second World War. Infant mortality decline as well as moderation of fertility had been the hallmarks of the post-war demographic scenario. Average life expectancy for the world as a whole moved up from 47 years during 1950–1955 to 70 years during 2010–2015. The data in Table 5.6 speak well of the progress achieved in most parts of the world.

Japan currently has a life expectancy of 83.5 years. North America is close, while others are catching up fast with the sole exception of Africa.⁴ Most of the world has gotten rid of the unacceptably high child mortality. This escape from

Table 5.6 Life expectancy 1950–2015

<i>Region</i>	<i>1950–1955</i>	<i>1990–1995</i>	<i>2010–2015</i>
Africa	37.4	51.7	58.2
Asia	42.2	65.4	71.4
Europe	63.6	72.6	76.1
Latin America and the Caribbean	51.4	68.9	74.7
North America	68.6	75.8	79.1
Oceania	60.4	72.5	77.6

Source: UN, *World Mortality Report 2013*, p.13

premature mortality was at the center of the 2013 book *The Great Escape* by Princeton's Professor Angus Deaton, who received the 2015 Economics Nobel.

His book has received much attention since publication. The most repeated statement in and about the book has been: "Things are getting better and hugely so". The world has progressed a lot in terms of steep reductions in poverty and vast improvements in life expectancy.

The key components of the Deaton book are (1) health (three chapters), telling the story of progress, notably on mortality in general and infant mortality in particular; (2) material living standards (two chapters) that include not only progress in the rich nations but also in China and India and other developing nations; and (3) the final chapter on what needs to be done in the future.

Reviews of the book were positive on its valuable contribution on the great escape from death and deprivation (high infant mortality and poverty), but some question Deaton's views on the efficacy of foreign aid. In his April 2014 review, Bill Gates,⁵ referring to the seventh and final chapter, notes:

Deaton launches a sudden attack on foreign aid. . . . Deaton is right to point out some problems with aid. . . . But I wish he had spent more time than he does exploring better ways to give aid.

On aid, *The Economist* review (October 12, 2013) notes, ". . . with the exception of some health programmes it generally does more harm than good. . . ." The review also points out that poor countries suffer not from lack of resources but from bad governments – which also explains why foreign economic assistance does not work as much as it should.

5.4 Future: prospects and challenges

Growth prospects

The world economy has come a long way. The OECD *Economic Outlook 2013*, for instance, has forward projections that show the world in 2060 enjoying a 3.5 times per-capita GDP compared to five decades earlier in 2010. The

Table 5.7 Per-capita GDP in 2005 USD, 2010 and 2060

	2010	2060	Ratio		2010	2060	Ratio
OECD	30,187	65,376	2.2	India	2,970	27,552	9.3
Brazil	10,105	32,086	3.2	Russia	14,125	45,588	3.2
China	6,804	48,403	7.1	WORLD	12,608	44,051	3.5

Source: OECD, *Economic Outlook 2013* baseline projections

economic powerhouses are going to be China and India moving ahead by 7 times and 9 times, respectively, in those five decades.

Grave challenges

There are problems and challenges galore facing people, nations and the world at large. Though this list is much too short to be considered complete and comprehensive, a sample could run as follows:

- Violence in general and terror attacks, and inadequate security for women, the aged and children in particular;
- Untruth in general and cheating, bribery and black money (income earned illegally and not reported to tax offices) in particular;
- Climate change in general and its excessive impact on low-income nations and poor people in particular; and
- Numerous dimensions of inequality – in income and wealth in particular – across individuals, families, racial groups, social and religious groups, nations and the world at large, the worst being the *grossly visible inequalities in housing, health care facilities and provisions, and educational institutions and standards*.

5.5 Inequality, the mother of all ills

So long as all the increased wealth which modern progress brings goes but to build up great fortunes . . . progress is not real and cannot be permanent.
(Henry George, *Progress and Poverty*, New York: Cosimo Inc., 2005; originally published 1879)

The Chartbook for Economic Inequality has estimates of Gini ratios for household incomes across countries and over time.⁶ Table 5.8A provides a summary tabulation of the data for selected years and countries.

Across all the one dozen ‘developed’ nations covered in the table, with the exception of France, inequality edged up in more recent years compared to the mid-1970s and early 1980s. Considering a Gini of less than 0.3 as fairly

Table 5.8A Household disposable income Gini ratios across countries and over time

<i>Country</i>	<i>Year</i>	<i>Gini</i>	<i>Year</i>	<i>Gini</i>
Australia	1981	0.27	2010	0.31
Canada	1977	0.29	2011	0.31
Finland	1981	0.21	2011	0.26
<i>France</i> ↓	<i>1975</i>	<i>0.35</i>	<i>2011</i>	<i>0.31</i>
Germany	1975	0.25	2010	0.28
Japan	1981	0.23	2008	0.25
Netherlands	1977	0.25	2008	0.28
New Zealand	1982	0.26	2009	0.32
Norway	1986	0.21	2011	0.25
Sweden	1975	0.24	2011	0.33
United Kingdom	1978	0.24	2011	0.34
Unites States*	1976	0.38	2012	0.46

Source: chartbookofeconomicinequality.com

*The US Gini ratios are based on gross household income

egalitarian, the United States stands out – a capitalist society with very high Gini ratios compared to all others.

The United States, which has achieved a place of eminence in economic power and military strength, has been experiencing increasing inequality over the past three decades. The historical data may be summarized as follows. From an all-time high of 0.5 in 1929, the Gini fell to 0.38 in 1945, was around that level through 1976, and has since climbed up year after year to reach 0.46 in 2012.

Apart from the numbers from the ‘chartbook’ (noted as the source in Table 5.8A), the US Census Bureau provides household income Gini ratios for the period 1967–2015, which are summarized in Table 5.8B showing ranges of years and their corresponding Gini ratios. It is clear that the nation had an all-time-high Gini during 2011–2015. A high Gini, as in the US, is the case with China and India – the top two most populous nations of the world, showcasing high rates of economic growth and a significant reduction in poverty and deprivation along with growing income inequality (see Mukhopadhaya, Shantakumar and Rao, 2011).

Surplus labour moving from agriculture to industry – the pattern of development the world had known – may be a thing of the past. Innovations of the past, present and the near future might also be replacing labour from manufacturing and services. Carl Benedikt Frey and Michael Osborne of Oxford University, in a 2013 paper,⁷ “examine how susceptible jobs are to computerization”. Based

Table 5.8B United States household income Gini ratios, 1967–2015

1967–1980	1981–1986	1987–1992	1993–2000	2001–2010	2011–2015
0.39–0.40	0.41–0.42	0.43	0.45–0.46	0.47	0.48

Source: US Census Bureau⁸

on a detailed examination and analysis of 702 different occupations, it is estimated that 47 percent of US employment is at high risk of being computerized. The high rates of unemployment could rock many a boat. The inequality problem may get accentuated in the future.

Inequality is not just in income and wealth. It is pervasive and visible in many cases. In health, for instance, there is a gap between the upper- and lower-income groups. With ever increasing costs of new drugs, diagnostic tests, hospitals and medical personnel, all may not be able to have equal access to health care. Visibility of inequality is also the case with housing and education. Most apartment complexes occupied by low-income families stand in sharp contrast to the lavish and sprawling bungalows of the rich. The government schools and private schools differ significantly in regard to infrastructure and learning resources.

Economic progress since World War II has been accompanied by increasing international economic disparities, propelled by truncated globalization that does not allow the free movement of people across countries to work and live as they wish. Instead, immigration into nations has been demand-driven – linked to specific skills. (The exception is when people in dire straits with no choice but to cross borders were to move into another country. They get the tags of illegal immigrants and refugees and may face starvation, ill-health, and at times severe punishments handed over by the host country.) The restriction on people movement has been one factor behind increasing income inequality within and between nations.

5.6 Inequality: recent studies

The website inequality.org (of the Washington DC-based Institute of Policy Studies) lists a number of studies in income and wealth inequality almost wholly pertaining to the situation in the US. Even when a selection is attempted with relatively exclusive focus on income and wealth inequality, a total of 35 books show up (see Appendix 5A), all published during 2003–2016.

The data in Table 5.9 reveal the pattern of change that has occurred in the fortunes of the different quintiles over the past six decades in the United States. In the first 30 years (1950–1980), it was a pro-poor America ensuring the highest increase in average income amongst the poorest 20 percent of families.

Table 5.9 1950–2010 growth in average American family income by quintiles (percent)

Quintile	1950–1980	1981–2000	2001–2010
Poorest 20%	141	11	–33
Second 20%	98	17	–24
Third 20%	106	22	–17
Fourth 20%	114	29	–10
Top 20%	96	61	–8

Source: ADAEF (2012), p.10

In contrast, during 1980–2000, the *highest increase* was for the top 20 percent, and the next decade (2000–2010) had the *lowest decline* for the top 20 percent. The pro-poor US transformed into pro-rich.⁹

The February 2016 ‘data and chart pack’ brought out by inequality.org provides pertinent information on the extent of inequality. For instance, the average family income in 2014 tells a graphic story: \$33,608 for the bottom 90 percent, versus \$295,845 for the top 10 percent, \$1.26 million for the top 1 percent and \$6.09 million for the top 0.1 percent. Real wages for workers at the bottom stagnated over the past three decades or so.

The pack also has an exceptionally revealing graph, which shows the *century* of change in the income share of the top 1 percent: about 24 percent in/around 1924, a gradual move down to 8.9 percent by 1974, and an upward move to 21.2 percent in 2014. *If one were to assume that the high share of income accruing to the top in the mid-1920s was behind the lack of demand growth leading to the Great Depression, then the immediate economic future is scary, not just for the US, but to the world at large due to the growing global linkages of today.*

It is not just income inequality that has gone up, but also consumption inequality (see Attanasio, Hurst and Pistaferri, 2012). The 35 books (Appendix 5A) are testimony to the emergence and continuation of a serious socio-economic problem of considerable significance in the ‘land of milk and honey’: “Despite the large increases in economic inequality since 1970, American survey respondents exhibit no increase in support for redistribution . . .” is a conclusion of a research study by the National Bureau of Economic Research (NBER) (Vivekinan, Ilyana and Washington, 2015).

What is even more revealing is the fact that inequality has been occupying center stage in recent economics discourse by celebrity scholars. Here is a sampling of the latest and most cited: Stiglitz (2012/2013), Piketty (2014) and Milanovic (2016). An attempt is made here to note their core messages. (There are, in fact, two more books by Stiglitz and Piketty that were published soon

after the ones noted. See Appendix 5B for the contents listing, brief summaries and reviews of all five books.)

Joseph Stiglitz (2012/2013): The Price of Inequality

This book of ten chapters is predominantly about the relatively more recent increases in income and wealth inequality in the United States, as in the cross-national and intra-US trends noted earlier.

Some may argue that complete non-interference in the markets is the best way to ensure efficiency and growth, and the resultant inequality must be endured. But, politics and politicians, for instance, interfere and dictate in the way the markets operate, and thus there are many different types of free markets. Business professionals and business houses are not just watchers of, and neutral players in, the free market. They try to influence the markets indirectly via their power over the policymakers and directly via promoting monopolies of different degrees. The implication is that one can seldom hope for a market mechanism that delivers less instead of more inequality.

Why worry about high levels of inequality? The main point is that relatively high inequality can lead to economic and social instability, while not helping to incentivize the lowly paid to work hard. Is it not feasible for a democracy to ensure moderation on the level of inequality? One person/one vote is true, but the rich influence who may contest and who could win. Those who win, of course, help to foster the agenda of the sponsors. The elite could have a say also in the operation of the justice system. Fiscal and monetary policies, too, favour the interests of the rich – they are by and for the top 1 percent.

Stiglitz's final chapter (Chapter 10) is on the way forward, with the assertion that another world is possible.

Thomas Piketty (2014): Capital in the Twenty-First Century

This *New York Times* Best Seller is 700 pages with an introduction, 16 chapters in four parts and a conclusion.

Piketty showcases the 'high' level of inequality across parts of the industrialized world, with the US in the top spot – a trend noted earlier in Table 5.8A. Piketty's projected Gini for the US in 2030 is 0.58. He demonstrates that returns to capital exceed the GDP growth rate and the trend may continue, leading to extreme wealth concentration.

Piketty's policy recommendations, such as raising marginal tax rates on the rich and the levy of a progressive global wealth tax, may not be acceptable to policymakers and politicians across the board. For instance, one should affirm that the US election of 2016 rejected such ideas. Martin Wolf (*Financial Times*, August 15, 2014) in his review says that the Piketty recommendations are 'unrealistic'.

Milanovic (2016): Global Inequality: A New Approach for the Age of Globalization

This book has an introduction and five more chapters dealing with the following topics: the rise of the global middle class and global plutocrats; inequality within countries; inequality among countries; global inequality in this century and the next; and what next?

Between countries, inequality declined in recent decades, but inequality within countries increased. The last chapter (Milanovic, 2016, pp. 212–239) has *ten short reflections on the future of income inequality and globalization*. One of the reflections concluded that in the future, wage inequality will tend to rise. The tenth and last reflection (p.239) is short, sharp and the best. It is just one simple question: will inequality disappear as globalization continues? And the answer, too, is straight and simple: “No. The gains from globalization will not be evenly distributed”.

Foreign Affairs (January–February 2016)

A number of authors wrote in early 2016 on inequality for the prestigious magazine *Foreign Affairs*. Practically all the essays were about inequality in the United States – a problem highlighted earlier. Five of the essays are cited below along with the main points and comments by the author where appropriate.

Inglehart: This essay has a brilliant and brief narrative of the long history of the movement of societies from pre-agricultural to agricultural, industrial and post-industrial. The post-industrial phase is exemplified by expert systems replacing people. In such a scenario, “market forces alone could conceivably produce a situation in which a tiny but extremely well-paid minority directs the economy, while the majority have precarious jobs, serving the minority as gardeners, waiters, nannies, and hairdressers . . .” (Inglehart, pp. 7–8).

In the opinion of Inglehart, vibrant democracies have the vitality to address the issue of inequality and reverse the trend. That it may not be so for some more time to come has been demonstrated by the results of the 2016 US Presidential election.

Bourguignon: Bourguignon (p.11) makes the point that “people tend to compare themselves to the people they see around them rather than to those who live on the other side of the world”. Thus, intra-country inequality is of immediate and great concern. His policy recommendations are not new: redistribution, strengthening regulation of labour and financial markets, and measures to prevent firms from accessing tax havens.

Rosanvallón: Early in the twentieth century, it was the fear of communism (and Marxism) ruling the roost, leading to efforts to address societal perceptions of exploitation. Now that this fear has exited from the world stage, inequality is less of a threat. However, development and inequality do not seem to go together well, and the issue needs to be addressed. One would expect a perfect solution for addressing the inequality problem, going by the title of the article,

‘How to Create a Society of Equals . . .’ The solution is not clear, even if one agrees that “a theory of equality . . . should rest on . . . recognition of people’s singularity . . . , organization of reciprocity . . . , and the constitution of commonality . . .” (Rosanvallon, p.20).

Allen: In the specific context of the US, Allen (p.23) deliberates on “what equality means and how it might be pursued”. On pages 25 and 26 of the essay, Allen touches on the various facets of equality: moral, political, social and economic. One of the most appropriate is to ensure “equally qualified individuals have equal chances at jobs and valuable positions in society”.

Allen (p.26) approvingly refers to John Rawls in as much as inequalities via policies may be justified if and only if the worse off are a bit better off. Finally, Allen (p.28) addresses the play of money in politics, which acts as “both the consequence and the enabler of rising economic inequality”.

Atkinson: The well-known researcher provides a number of policy prescriptions, which are briefly summarized as follows: preferring job creating and protecting technologies, progressive income taxation (the top income bracket attracting 65 percent tax), taxes on wealth transfers to fund the minimum inheritance to every 18-year-old, government transfers (starting with an allowance for child raising) and finally, unemployment targeting in line with inflation targeting.

5.7 Attacking inequality: suggested policies and actions

The ADAEF (2012) has a page full of recommendations. These include: (1) reversing deep cuts in programs that help low-income and poor families and the disabled and elderly; (2) expanding job opportunities through public works and public services; (3) enacting laws to require equal benefits for those at the top and bottom of corporate America; (4) making it mandatory for employers to provide a minimum level of health, pension and other benefits; (5) ensuring equality of educational opportunity across all income levels; (6) encouraging relatively more progression in taxation; (7) encouraging collective bargaining; (8) ending subsidies to companies that export jobs; (8) encouraging the Federal Reserve to focus on high employment/high growth instead of inflation control; and (9) encouraging labour unions and the protection of rights of unorganized workers.

The website inequality.org provides a listing of current campaigns that one can support.¹⁰ One campaign “aims to put the brakes on concentrated wealth by restoring the estate tax”. The second is Oxfam’s new campaign which “focuses on taxing the wealthy, investing in public health and education, and demanding fair wages for all”. The third campaign proposes a financial transaction tax on Wall Street transactions with the potential to raise billions. The fourth campaign is a general and wider one to bring together various organizations to support a “tax system that works for all Americans”. The fifth campaign is focused on Walmart, “to reform its business practices to set the stage for changes across

the retail sector”. The sixth and seventh campaigns are about raising minimum wages and ensuring justice for all workers. The final campaign is to “rein in the power of hedge funds. . . .”

Stiglitz on policy

Stiglitz (2012/2013) has been succinctly summarized and strengthened in his paper (Stiglitz, 2014)¹¹ presented at the May 2014 Workshop on *Sustainable Humanity, Sustainable Nature: Our Responsibility* organized jointly by the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences. The first 13.5 pages in the paper are a summary of the first nine chapters of the book. The policy part (Chapter 10 in the original work) comes next, and in short, the following are *some of the suggested policies* (Stiglitz, 2014, pp. 13–16): moving more people out of poverty and strengthening the middle class; more support for education (including preschool); increasing the minimum wage and giving more voice to workers in the workplace; more effective enforcement of anti-discrimination laws; better corporate governance and better financial sector regulations; and a fairer tax system.

Equalizing opportunity: education holds the key

Fryer (2010) underscores the importance of quality education to reduce the racial gaps in living standards. Currie (2011) provides evidence on how child health at birth is positively influenced by the mother’s education, along with other factors.

Ground reality

The ground reality is well summed up by Chomsky’s ten trends (Appendix 5C), which include little or no voice for low- and middle-income groups, the rich paying relatively less taxes, the crafting of regulations by those to be regulated, and businesses impacting politics and justice. In the words of Martin Wolf: “. . . the most convincing argument against the ongoing rise in economic inequality is that it is incompatible with true equality as citizens”.¹²

For the writer of this book, who has been associated with research on income inequality since the late 1970s,¹³ it is reassuring to see Nobel Laureates and other distinguished scholars from the developed world presently addressing these issues.

Policy innovation along with policy fairness is what is needed today. It is the duty of intellectuals to ensure that right policies and solutions are advocated for safeguarding the equality of opportunity to one and all and for moderating the top incomes via well-designed incentives. For instance, the One United World society and economy with no barriers for people movements intuitively appears to be the right mechanism to ensure global equality, peace and welfare.

Appendix 5A

Books on US inequality: selected list from inequality.org¹⁴

2016

- Stewart Lansley: *A Sharing Economy: How Social Wealth Funds Can Reduce Inequality and Help Balance the Books*, (Policy Press)
 Branko Milanovic: *Global Inequality: A New Approach for the Age of Globalization*, (Belknap Press of Harvard University Press)

2015

- Simon Reid-Henry: *The Political Origins of Inequality: Why a More Equal World Is Better for Us All*, (University of Chicago Press)
 Les Leopold: *Runaway Inequality: An Activist's Guide to Economic Justice*, (Labor Institute Press)
 Salvatore Babones: *Sixteen for '16: A Progressive Agenda for a Better America*, (Policy Press/University of Chicago Press)

2014

- Danny Dorling: *Inequality and the 1%*, (Verso)
 Thomas Piketty: *Capital in the Twenty-First Century*, (Harvard University Press)
 David Cay Johnston (Editor): *Divided: The Perils of Our Growing Inequality*, (The New Press)
 Earl Wyson, Robert Perrucci, and David Wright: *The New Class Society: Goodbye American Dream?* (Rowman & Littlefield, fourth edition)

2013

- Linda Pinkow, Sam Pizzigati, and the Dollars & Sense Collective: *The Wealth Inequality Reader*, (Economic Affairs Bureau, fourth edition)

2012

- Joseph Stiglitz: *The Price of Inequality: How Today's Divided Society Endangers Our Future*, (W.W. Norton)
 Chuck Collins: *99 To 1: How Wealth Inequality Is Wrecking the World and What We Can Do About It*, (Berrett-Koehler)

Chrystia Freeland: *Plutocrats: The Rise of the New Global Super-Rich and the Fall of Everyone Else*, (Penguin)

Timothy Noah: *The Great Divergence: America's Growing Inequality Crisis and What We Can Do About It*, (Bloomsbury Press)

Sam Pizzigati: *The Rich Don't Always Win: The Forgotten Triumph over Plutocracy that Created the American Middle Class, 1900–1970*, (Seven Stories Press)

2010

Jacob Hacker and Paul Pierson: *Winner-Take-All Politics: How Washington Made the Rich Richer – And Turned Its Back on the Middle Class*, (Simon & Schuster)

Linda McQuaig and Neil Brooks: *The Trouble with Billionaires*, (Viking Canada)

2009

Richard Wilkinson and Kate Pickett: *The Spirit Level: Why Greater Equality Makes Societies Stronger*, (Bloomsbury Press)

Les Leopold: *The Looting of America: How Wall Street's Game of Fantasy Finance Destroyed Our Jobs, Pensions, and Prosperity*, (Chelsea Green Publishing)

Benjamin Page and Lawrence Jacobs: *Class War? What Americans Really Think about Economic Inequality*, (University of Chicago Press)

2008

Jared Bernstein: *Crunch: Why Do I Feel So Squeezed?* (Berrett-Koehler)

George Irvin: *Super Rich: The Rise of Inequality in Britain and the United States*, (Polity Press)

Michael Schwalbe: *Rigging the Game: How Inequality Is Reproduced in Everyday Life*, (Oxford University Press)

2007

Robert Kuttner: *The Squandering of America: How the Failure of Our Politics Undermines Our Prosperity*, (Alfred A. Knopf)

Robert H. Frank: *Falling Behind: How Rising Inequality Harms the Middle Class*, (University of California Press)

2006

Meizhu Lui, Bárbara Robles, Betsy Leondar-Wright, Rose Brewer, and Rebecca Adamson, with United for a Fair Economy: *The Color of Wealth: The Story Behind the U.S. Racial Wealth Divide*, (The New Press)

Dean Baker: *The Conservative Nanny State: How the Wealthy Use the Government to Stay Rich and Get Richer*, (Center for Economic and Policy Research, full text available online)

Stewart Lansley: *Rich Britain: The Rise and Rise of the New Super-Wealthy*, (Politico's)

2005

James Lardner and David A. Smith (Editors): *Inequality Matters: The Growing Economic Divide in America and Its Poisonous Consequences*, (New Press)

Chuck Collins and Felice Yeskel: *Economic Apartheid in America: A Primer on Economic Inequality and Insecurity*, (New Press)

Richard G. Wilkinson: *The Impact of Inequality: How to Make Sick Societies Healthier*, (New Press)

2004

Betsy Leondar-Wright, Amy Offner, Adria Scharf, Meizhu Lui, Amy Gluckman, and Chuck Collins (Editors): *The Wealth Inequality Reader*, (Dollars & Sense)

Sam Pizzigati: *Greed and Good: Understanding and Overcoming the Inequality That Limits Our Lives*, (The Apex Press, full text available online)

Thomas M. Shapiro: *The Hidden Cost of Being African American: How Wealth Perpetuates Inequality*, (Oxford University Press)

Appendix 5B

Five books on inequality: brief notes/reviews

The five books here refer to two by Joseph Stiglitz (2012/2013, 2015); two by Thomas Piketty (2014, 2015); and one by Branko Milanovic (2016).

Stiglitz (2012/2013): *The Price of Inequality*

The 2013 paperback edition has 523 pages and comprises ten chapters, with text occupying 363 pages and notes taking a whopping 137 pages. The book is predominantly about the relatively more recent increases in income and wealth inequality in the United States and what needs to be done to arrest the process before the worst economic and social ills takeover.

Chapter titles

The chapter headings are: (1) America's 1 Percent Problem; (2) Rent Seeking and the Making of an Unequal Society; (3) Markets and Inequality; (4) Why it Matters; (5) A Democracy in Peril; (6) 1984 is Upon Us; (7) Justice for all? How Inequality is eroding the Rule of Law; (8) The Battle of the Budget; (9) A Macroeconomic Policy and a Central Bank by and for the 1 Percent; *and* (10) The Way Forward: Another World is Possible.

Some of the main points

It is not easy to summarize this great book. This attempt here is to put forth a few of the important observations that at least serve to remind the importance of the subject that attracted the attention of the Nobel Laureate.

Chapter 1 is on the increases in inequality and the factors behind the rise, such as increasing unemployment, rising personal indebtedness and declining retirement benefits. As noted on pages 28–29 of the book, the Gini ratio is around 0.3 in the Scandinavian countries versus 0.48 in the US.

The crux of Chapter 2 is that market forces create inequality; but government policies should work to moderate it. On the contrary, the high level of inequality in the country is due to policies that contribute notably by favouring rent seekers.

Chapter 3 is about the well-known argument of the free-market philosophers who believe that complete non-interference in the markets is the best way around, and whatever inequality one obtains as a result must be endured. The problem in reality is much more complex. Politics and politicians, for instance, interfere and dictate in the way the markets operate, and thus there are many different types of free markets. Business professionals and business houses are not just watchers of, and neutral players in, the free market. They try to influence the markets indirectly via their power over the policymakers and directly via promoting monopolies of different degrees. The implication is that one can seldom think of the market mechanism that delivers less instead of more inequality.

Chapter 4 addresses the question: why worry about high levels of inequality? The entire chapter will get copied here if one wishes to cover the subject adequately. A simple but limited summary is that relatively high inequality can lead to economic and social instability, while not helping to incentivize the lowly paid to work hard.

Chapter 5 is about the vibrant US democracy: one person/one vote is true, but the rich influence who may contest and who could win. Those who win, of course, help to foster the agenda of the sponsors. This bias could even affect the integrity of the justice system.

Chapter 6 covers new ground – generally out of sight in books on income and wealth inequality. It is about how perceptions are formed and how the modern market economies can succeed in changing them. Perceptions on inequality are no exception.

The next three chapters, respectively, deal with how the justice system and the rule of law are governed by the elite interests (Chapter 7), the discourse on the budget deficit and the way the debate has been under the care of the top 1 percent (Chapter 8), and the way monetary policy has been favouring the interests of those at the top of the income ladder (Chapter 9).

The final chapter is on the way forward, with the assertion that another world is possible.

Reviews

This book “is the single most comprehensive counterargument to both Democratic neoliberalism and Republican laissez-faire theories”, according to Thomas Edsall.¹⁵ Noting that one of the key arguments of the book pertains to the operation of competitive markets, the reviewer affirms that they ensure efficiency but not necessarily equity – something that government regulation has to accomplish when needed. On paper this looks great, but in practice, regulation design as well as regulators can be influenced by the rich and powerful.

Yvonne Roberts, in his review in *The Guardian* (July 13, 2012), notes: “In *The Price of Inequality*, Joseph E. Stiglitz passionately describes how unrestrained power and rampant greed are writing an epitaph for the American dream”. Roberts mentions in particular the argument by Stiglitz that the US inequality

is reaching a level that is “intolerable”. A lot of this is due to rent seekers, who do not help to increase the size of the cake, but take a large portion. There is competition for name’s sake, but monopoly is in reality: despite numerous banks on the ground, the big four share half of the whole sector.

In the review in *The Economist* (June 23, 2012), the reviewer notes: “On the whole, America’s wealthy prosper while the average citizen struggles . . .”, but finds fault with Stiglitz for advocating free movement of labour across nations, which promise good schools and good environment to get good workers, eventually leading to better and more equal societies.

Stiglitz (2015): *The Great Divide*

This is a collection of articles that add little value to the *Price of Inequality*. Of the total, excluding the prefaces to the Japanese and Spanish editions of *Price* and an interview reported in *Vanity Fair*, the book has 49 articles in all, with 33 of them from the *New York Times* (16) and *Project Syndicate* (17). In terms of timelines, as many as 37 articles appeared during 2012–2014.

Following the review in *The Wall Street Journal* (April 22, 2015) by Brian Wesbury, the three major themes of the articles may be identified as follows: causes of the 2008 financial crisis (President Bush, bankers, deregulation and inequality); the great income divide in America and its many causes and consequences; and running the world as per the given prescriptions.

Thomas Piketty (2014): *Capital in the Twenty-First Century*

The #1 *New York Times* Best Seller is of 700 pages with an introduction, 16 chapters in four parts and a conclusion. The original French edition was published in 2013.

Like Stiglitz, Piketty too showcases the ‘high’ level of inequality across parts of the industrialized world, with the US in the ‘top’ spot. Piketty demonstrates that returns to capital exceed GDP growth rate and the trend may continue, leading to extreme wealth concentration. This may or may not happen, depending on whether or not demand and supply-side factors cooperate and produce good overall economic growth.

One of the major points made by Piketty, namely, the continuation of the concentration of wealth, may or may not hold. The wealth Gini rising or falling must be subjected to serious scrutiny since data on wealth across the various wealth classes at current replacement cost may not be easy to come by. Indeed, if income inequality stabilizes at a fair level, say, with a Gini of 0.3 or thereabouts, should one worry about wealth inequality at all?

A good review of the book was by Stephanie Flanders in *The Guardian* (July 17, 2014). The reviewer notes at the end: “Piketty deserves huge credit for kick-starting a debate about inequality. . . .” It is worth noting here that the problem of inequality is not something that has been ignored all along. Nor is

it true that academics have simply accepted the Kuznets curve as a must-happen doctrine.

While reviewing Piketty (2015),¹⁶ the 2008 Nobel Prize winner Paul Krugman points out that *Capital in the Twenty-First Century* “is a powerful, beautifully written book. . . .”

Piketty’s policy recommendations (such as raising tax rates on the rich) faced some dissent. For instance, Martin Wolf (*Financial Times*, August 15, 2014) says that the recommendations such as “far higher marginal tax rates on top incomes and a progressive global wealth tax” are bold and “unrealistic”.

Piketty (2015): *The Economics of Inequality*

In contrast to the earlier book, this one is very slim, with 133 pages of text matter and a few more pages of front matter and an index. Apart from the introduction, there are just four chapters: The Measurement of Inequality and its Evolution; Capital-Labor Inequality; Inequality of Labor Income; and Instruments of Redistribution.

Given the fact that this book is coming *after* his *Capital in the Twenty-First Century*, one would expect that the slim work is a simple, reader-friendly summary of the earlier 700-page opus. That is not so. In the ‘note to the reader’ upfront, the author points out that the book is an update of his 1997 work: “It should be noted . . . that the work essentially reflects the state of knowledge and data available at that time”.

Much to the possible surprise of Piketty, Paul Krugman, in his review of the book (*New York Times*, August 2, 2015) says: “Let me be blunt: I don’t know how the decision was made to release this. . . .” And also: “. . . readers who see only this volume will end up placing far too much faith in a story that emphasizes the invisible hand of the market, and too little on the visible role of powerful institutions”.

Milanovic (2016): *Global Inequality: A New Approach for the Age of Globalization*

This book of 310 pages has an introduction and five more chapters: Rise of The Global Middle Class and Global Plutocrats; Inequality Within Countries; Inequality Among Countries; Global Inequality in this Century and the Next; and What Next?

The last chapter (Milanovic, 2016, pp. 212–239) has *ten short reflections on the future of income inequality and globalization*. Of the ten, a few are briefly noted below. One of the reflections concluded that in the future, wage inequality will tend to rise. Another observation is about existential equality. Milanovic notes (p.230) that it is “equivalent to what John Rawls calls meritocratic equality”. Anyone can rise up to any height; it is just that only some succeed. Perhaps the tenth and last reflection (p.239) is the best. It is just one simple question: will inequality disappear as globalization continues? And the answer, too, is

straight and simple: “No. The gains from globalization will not be evenly distributed”.

Moving from Kuznets curves to Kuznets waves,¹⁷ extrapolations on the feasibility of further reductions in inequality between countries, the expectation of a fall in the extent of inequality in China due to labour shortages and wage hikes, and so on add a lot to the discourse on inequality. Yet there is not as much as one would like to see to solve the problem and its causes and consequences.

Appendix 5C

Chomsky's ten principles of concentration of wealth

The following listing of ten principles is based on a documentary entitled *Requiem for the American Dream*. The one/two-sentence explanations under each principle cannot be expected to do justice to what Professor Chomsky has stated in the documentary. The attempt here is to highlight the principles.

1. **Reduce Democracy** The top income group has the most say and the bottom has little or no voice.
2. **Shape Ideology** Business must exercise control over society in general and labour in particular.
3. **Re-designing the Economy** The financial sector has a major role versus the manufacturing sector.
4. **Shift the Burden** The American Dream is all about egalitarian growth. In contrast, financial sector supremacy implies little concern and care for workers and jobs. Now the rich are taxed relatively less.
5. **Attack Solidarity** Social security builds solidarity. Now with reduced funding and hints on moving towards the privatization of social security, solidarity is adversely affected. "I pay taxes and thus indirectly help children go to school" – this is solidarity. Now a college education is funded by tuition fees. A school education, too, might eventually see more and more privatization.
6. **Run the Regulators** There is increasing regulatory capture. Bank lobbyists prepare financial regulation. There were no financial crashes and crises in the 1950s and 1960s. Ronald Reagan bailed out banks; George W. Bush and Barack Obama followed. The concept of 'too big to fail' has been the excuse for the bailouts. Neoliberalism is in vogue – one set of rules for the rich, another for the poor.
7. **Engineer Elections** The concentration of wealth is leading to a concentration of political power as elections are becoming more expensive. Business to politicians to power to justice (judges' appointments) to business is the vicious circle.
8. **Keep the Rabble in Line** The International Labour Organization (ILO) has the basic tenet – the right to free association. The US never ratified that. Just about 7 percent of private sector workers are unionized.

9. **Manufacture Consent** Using enormously persuading advertisements, wants are fabricated and consumers are fabricated. The advertising industry indirectly controls everyone. The viewer and her/his TVs are the inseparable pair. As the logical end, a totally uninformed electorate is created. President Obama, the winner of two elections, has seldom said much on policy preferences and priorities.
10. **Marginalize the Population** As high as 70 percent of the population has no say on policymaking.

Appendix 5D

Tables

Table A5.1 US GDP composition, 1971–2014 (percent)

	1971– 1980	1981– 1990	1991– 2000	1971– 2000	2001– 2010	2011– 2014	2001– 2014
Professional and personal services	12.4	16	23.7	17.4	29.7	30.7	30.2
Finance, insurance and real estate	14.3	16.7	18.5	16.5	20.0	19.9	19.9
Government	14.5	13.8	13.3	13.9	13.5	13.5	13.5
<i>Sub-total</i>	<i>41.2</i>	<i>46.5</i>	<i>55.5</i>	<i>47.8</i>	<i>63.2</i>	<i>64.1</i>	<i>63.6</i>
Manufacturing	22.3	19	16.3	19.2	12.9	12.2	12.5
Wholesale and retail trade	16.5	15.8	14.1	15.5	12.1	11.8	11.9
Transportation, communications and public utilities	8.7	8.8	6.7	8.1	4.5	4.6	4.5
Construction	4.8	4.3	4	4.4	4.5	3.7	4.1
Mining	2.5	3	1.2	2.2	1.8	2.6	2.2
Agriculture, forestry and fishing	2.8	1.9	1.4	2.0	1	1.3	1.1
Statistical discrepancy	1.1	0.6	0.7	0.8	0	0	0
Total	100	100	100	100.0	100	100	100

Source: As for Table 5.4

Table A5.2 Inventions, 1900–1950

<i>Year</i>	<i>Invention</i>	<i>Year</i>	<i>Invention</i>	<i>Year</i>	<i>Invention</i>
1900	Zeppelin – manoevable balloon	1920	Sticky plasters	1935	Radar
1901	Vacuum cleaner	1923	Hearing aid	1936	Helicopter
1903	Aeroplane	1923	Television	1936	Magnetic recording
1904	Colour photography	1923	Ultracentrifuge	1938	Ballpoint pen
1904	Radar (for shipping)	1924	Frozen food	1938	Photocopier
1904	Vacuum diode (valve)	1926	Aerosol sprays	1939	Frequency modulation
1905	Synthetic plastic	1926	Liquid fuel rocket	1942	Atomic power
1905	Windscreen wipers	1926	Pop-up toaster	1942	Guided missile
1906	Amplitude modulation	1927	Colour television	1942	Napalm
1906	Triode (amplifier)	1927	Quartz timekeeping	1943	Aqualung
1908	Assembly line	1927	Talking pictures	1944	Kidney dialysis
1908	Geiger counter	1927	Videophone	1945	Atomic bomb
1908	Haber process (artificial nitrates)	1928	Antibiotics	1946	Automation
1909	Bakelite (heat-resistant plastic)	1928	Iron lung	1946	Microwave oven
1909	Tungsten filament	1930	Jet engine	1947	Artificial intel
1910	Neon light	1930	Sticky tape	1947	Hologram
1911	Electric car-starter	1931	Electric razor	1947	Mobile phone
1913	Brasière	1931	Nylon	1947	Transistor
1913	Zip	1932	BBC Television	1948	Computer
1916	Radio dials	1932	Polaroid	1948	LP (long-playing) record
1916	Sonar	1932	Radio telescope	1948	Velcro
1919	Mass spectrometer	1933	Electron microscope	1949	45-rpm (revolutions per minute) record
1920	Hair dryer	1934	Cat's eye (for lighting)	1950	Credit card

Source of basic data: http://www.krysstal.com/display_inventions.php?years=1900+to+1950
 [Accessed on January 13, 2016].

Table A5.3 Inventions by country, 1900–1950

<i>Country</i>	<i>1901– 1925</i>	<i>1926– 1950</i>	<i>1901– 1950</i>	<i>Country</i>	<i>1901– 1925</i>	<i>1926– 1950</i>	<i>1901– 1950</i>
England	5	6	11	Scotland	1	2	3
France	2	1	3	Sweden	2		2
Germany	5	3	8	Switzerland		2	2
Hungary		2	2	Europe	15	18	33
Netherlands		1	1	USA	13	23	36
Norway		1	1	<i>Total</i>	<i>28</i>	<i>41</i>	<i>69</i>

Source: As for Table A5.2

Table A5.4 Selected innovations, 1950–2010

<i>Year</i>	<i>Path-Breaking and Directly Value-Adding</i>	<i>Other</i>
1950s	Microwave oven	
1954	Fiber optics	
1956	Commercial nuclear power production	
1957	Fiber-optic gastroscope	Sputnik space satellite
1958	Development of integrated circuit	
1959	Computer-aided design system	
1960s		Snowmobile
1960	Ruby laser	
1962	Light-sensitive (photochromic) glass	
1964	E-commerce	
1965	Portable defibrillator for treating cardiac arrest patients	
1966	Super-strong plastic	
1967		Vacuum fluorescent display
1968		Molecular beam epitaxy
1969	World's first solar power station opened in France	
1969	Light-sensitive chip for digital cameras, webcams, etc.	Astronauts walk on the Moon
1960s	Computer mouse; Compact disc	
1971	Electronic ink; Microprocessor	
1973	Mobile phone	
1974	Barcode	
1975		Home automation system
1976	First personal computer, Apple 1	
1970s– 1980s	Vacuum cleaners; Sony Walkman	

<i>Year</i>	<i>Path-Breaking and Directly Value-Adding</i>	<i>Other</i>
1981	IBM personal computer Laser eye surgery for removing cataracts	Space shuttle's maiden voyage
1983	Launching of compact discs (CDs)	
1987	TV projection system	
1989	World Wide Web	Phone calls over internet
1990	MEGA 1, world's first radio-controlled wristwatch	
1991	First version of Linux	
1994	Mathematics behind iris scanning systems	
1995	Online radio; eBay auction website	
1996	HDTV	
1997	Wi-Fi, a worldwide standard for wireless Internet	
2001	iPod MP3 music player; Energy-absorbing D3O plastic; Wikipedia; Bit-Torrent file-sharing; Self-healing materials	
2002	Vacuum-cleaning robot	
2004	Electronic voting; Grapheme	
2007	Kindle electronic book launch; Apple introduces the iPhone	
2010	Apple releases iPad; 3D TV more widely available	

Based on information at <http://www.explainthatstuff.com/timeline.html> [Accessed on August 5, 2015].

Notes

- 1 The observation was made in a lecture at the then University of Singapore. The author had the privilege of listening to the great statesman with a firm development agenda.
- 2 The International Monetary Fund (IMF), the World Bank and the General Agreement on Tariffs and Trade (GATT)/ World Trade Organization (WTO), for instance, were in a large measure helping the development of low-income economies along with safeguarding global monetary stability and trade.
- 3 *World population shares (percent) of the major regions, 1950–2015 (selected years).*

	<i>1950</i>	<i>2010</i>	<i>2015</i>		<i>1950</i>	<i>2010</i>	<i>2015</i>
<i>Africa</i>	<i>9.1</i>	<i>15.1</i>	<i>16.1</i>	<i>Latin America and Caribbean</i>	<i>6.7</i>	<i>8.7</i>	<i>8.6</i>
<i>Asia</i>	<i>55.2</i>	<i>60.2</i>	<i>59.8</i>	<i>Australia, New Zealand, USA, Canada</i>	<i>7.2</i>	<i>5.3</i>	<i>5.3</i>
<i>Europe</i>	<i>21.7</i>	<i>10.6</i>	<i>10</i>	<i>Others</i>	<i>0.1</i>	<i>0.1</i>	<i>0.1</i>
<i>Total World Population (Mill)</i>					<i>2,525</i>	<i>6,930</i>	<i>7,349</i>

Source of basic data: UN Population Division

- 4 In terms of infant mortality, 64 out of 1,000 newborn children in Africa die before first birthday.
- 5 <https://www.gatesnotes.com/Books/Great-Escape-An-Excellent-Book-With-One-Big-Flaw> [Accessed on April 15, 2016].
- 6 <http://www.chartbookofeconomicinequality.com/> [Accessed on November 10, 2016].
- 7 http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf [Accessed on November 1, 2016].
- 8 <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-inequality.html> (re: Table H-4, Gini Ratios for Households) [Accessed on November 1, 2016].
- 9 The poor of America in 2010: 13 percent among the Whites, 27.4 percent among the Blacks and 26.6 percent among the Hispanics.
- 10 Accessed on June 12, 2016.
- 11 Available at <http://www.casinapioiv.va/content/dam/accademia/pdf/es41/es41-stiglitz.pdf>.
- 12 Martin Wolf in his review of Piketty's *Capital* in *The Financial Times*, August 15, 2014.
- 13 The author's publications include two books, eight chapters in books and 18 papers in refereed journals. The books are Rao and Ramakrishnan (1980) and Mukhopadhyaya, Shantakumar and Rao (2011, 2013).
- 14 Source: <http://inequality.org/books-inequality/> [Accessed on June 6, 2016]. In addition, Siglitz (2015) and Piketty (2015) are added.
- 15 See *New York Times* Book Review (August 5, 2012) by Professor Thomas B. Edsall of the Columbia School of Journalism.
- 16 *New York Times*, August 2, 2015.
- 17 Do we need these anymore? This writer has long ago stated in some of his publications that what certainly holds is the increase in inequality over the periods of rapid growth, but nothing more can be proclaimed with any certainty. This is because market forces will do nothing to moderate inequalities. Policies can. But thanks to globalization of market ideology, the scope for policies to look at vertical inequality has come down drastically.

Part III

Understanding and tackling evolutionary failure



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6 The idea of evolutionary failure

6.1 Not only mismatch, but also failure

Towards the end of 2013, *The Story of the Human Body: Evolution, Health and Disease* by Daniel Lieberman (2013) was released. Looking at ‘Evolution’ in the by-line of the title, the author of the present work felt that this chapter was already crafted. But, the Harvard evolutionary biologist’s focus was on the proper use of our bodies. As noted in the preface of the book (page xii), “We didn’t evolve to be healthy . . . we never evolved to make rational choices about what to eat or how to exercise in conditions of abundance and comfort”.

Lieberman’s book (460 pages and 13 chapters) is about the numerous mismatches between what we need to do to remain healthy and what we actually do in the world of today. Consider, for instance, the fact that a few centuries ago, common people in developing countries did not wear shoes. This strengthened the feet, legs and hips and helped them stay free from several of the modern-day injuries.

Mismatch is also widespread in what one routinely eats in the high-income nations and what is good for their health. Foods high in sugar and fat are mass-produced and reasonable on the pockets, but they are behind obesity and resulting ill-health. Lieberman recommends government policies, such as taxing such foods, to incentivize the consumption of healthy diets.

Apes to humans, but not as good to stay fit and healthy – this is how natural selection and evolution seemed to have worked. Yes, our ancestors could have been the chimps and apes, but then what have we learnt from that knowledge? Of what use is this knowledge to the present populations? Has that knowledge (from ape to human) helped in reducing all agony and worry and promoted joy and peace for one and all? Has that knowledge helped in preventing disasters caused by endless exploitation of Mother Nature?

An important feature of human evolution has been the development of the skull, and rising cranial capacity. Growth in the skull size has been prominent, and the brain naturally has been working a lot more in us, humans, perhaps compared to apes. Scientists have studied the development of almost each and every one of the key organs and their components – from face, mouth and teeth to thighs, legs and feet. The ideas of beauty and ugly have taken deep

roots among us, the humans. Such demonstrated distinctions and ingrained differences hardly help in fostering unity and peace.

Apes have used the thought process. Humans perfected the process and marched ahead to an extent unimagined by any ape, and perhaps not even by any human a few centuries ago. There were numerous benefits that have accrued to humanity from great imaginations and dreams becoming inventions and innovations. Those born in the 1930s on have been witness to the great march from railway trains to propeller/jet planes, from disturbing landline telephones to mobile phones, from hand-aching calculators to modern computing machines, from typewriters to laptops, from silent movies to high-definition stereo movies, and so on.

As noted by Avner Offer (2006), the United States and Britain achieved considerable material progress since the Second World War, but the people's material prosperity did not lead to a matching degree of well-being. This was due to (Offer, p.2) growing social and personal disorders, including family breakdown, addiction, mental instability, crime, obesity, inequality, economic insecurity, and declining trust. The modern consumer society and consumer behaviour help increase material consumption and millions of instants of transitory satisfaction, without necessarily maximizing human and social well-being.

We routinely describe great men and women who served humanity in one way or other as 'evolved souls'. Examples from the last century are Mother Theresa, Mahatma Gandhi and Martin Luther. The vast humanity other than the exceptional beings have not evolved in tune with their potential for the practice of truth and non-violence manifesting in high levels of compassion, kindness, peace and universal brotherhood.

6.2 Evolutionary failure

A Google search for evolutionary failure¹ provided some 32 million items/sites in less than half a minute. Appendix 6A has the list of sites on the first page of the search results. The very first site refers to the 2008 *Discovery* magazine article: Could Pandas Be an Evolutionary Mistake – or Proof of an Intelligent Designer? The dietary and other habits of the pandas are, in general, not in tune with survival of the fittest, and hence they are a motivating example for those in favour of intelligent design.

The second on the list is a self-hosted blog titled: I Am An Evolutionary Failure on the site www.bhagwad.com. On the premise that success is having children and failure is not to have, the author says that he and his wife are testimony to evolutionary failure since they do not wish to have children.

The website www.dailykos.com provides the third article, titled: Is the Human Mind an Evolutionary Failure? The point about the failure here is the inability of the human mind to prompt and persuade changes in living style to address the climate change horrors in store.

Next there is the evolutionnews.org note on the Top Ten Problems with Darwinian Evolution. These include, for instance, the failure of the fossil record

to provide support to Darwinian evolution; the failure of molecular biology to provide evidence on the grand tree of life; the rampant prevalence of convergent evolution that is against Darwinian theory; the failure of chemistry to explain the origin of the genetic code; the failure of developmental biology to explain why vertebrate embryos diverge from the beginning of development; and humans showing many behavioural and cognitive traits and abilities that offer no apparent survival advantage (e.g. music, art, religion, and the ability to ponder the nature of the universe).

The aforementioned examples of evolutionary failure are indeed wide-ranging. There is no explicit reference, however, to the *lack of widespread practice of the two core values of non-violence and truth as well as kindness and compassion*.

From selfish gene to further evolution

The celebrated book *The Selfish Gene* (Dawkins, 1976) was about gene survival and their passing on to the next generations. Celebrating the release of the thirtieth anniversary edition, Tim Radford brought out a review of the book in *The Guardian* of August 31, 2012. A key point made in the review is that not only the fittest in each species survive, but they also altruistically ensure the species lives forward as much as possible. Towards the end of the review in *The Guardian*, Radford quotes from the work of Dawkins: “We are built as gene machines . . . but we have the power to turn against our creators. We, alone on Earth can rebel against the tyranny of the selfish replicators”.

That very altruism has limitations galore in reality. As noted by Reich, Thanagaraj, Patterson, Price and Singh (2009) in their article in *Nature*, modern India is made up of the descendants of two major groups: Ancestral North Indians (ANI), genetically close to Middle Easterners, Central Asians, and Europeans; and Ancestral South Indians (ASI). Anyone would think that the two groups interacted freely, and mixed and mingled to create one united family of India. That was not to be (see Moorjani et al., 2013): the change that occurred was the transition from inter-mixing between different groups to marriage within their own communities, leading to caste divisions which are by no means a help for the welfare of the subcontinent. The ground is fertile for the fight against evolutionary failure, and to come up with a world free of divisions and violence.

Gowdy (2004 p.286) uses the term ‘coevolution’ to convey the two-way process of the impact of humans on the environment and vice-versa. For instance, the brain size increase over the millennia was “perhaps because intelligence became a new evolutionary advantage in dealing with rapidly changing conditions”. Intelligence gave man an ever-increasing advantage over all other species. That very intelligence propelled innovations that helped raise standards of living, but affected the environment, ending up in concerns on climate change and global warming. That intelligence also helped in inventing machines of mass destruction.

How can each and every citizen of the world be free from fear and want? How can the next phase of evolution bring about a high degree of equality and peace? These will be in the realm of the possible if evolutionary failure is understood and addressed.

Evolutionary failure (EF) refers to the lack of significant progress on the adherence to contextual truth and non-violence. That adherence contributed to phenomenal demographic and economic growth of the past. It has since taken a back seat, thanks to the apparent worship of wealth and the growth of greed with their multiple hues such as gross inequities, crime and corruption.

Markets may sanction anything and everything as long as the price is right. There is no market that can produce truth and non-violence; *instead, there are instances of successfully initiating and developing markets for untruth and violence.* That is no progress and no evolution. One must then address the issue upfront.

Evolutionary failure has its manifold manifestations with effects at individual and societal levels. The two World Wars and the Great Depression, for instance, were, in the final analysis, the result of giving a go by to the conscious pursuit of truth and non-violence. Human evolution in the gross sense of survival of the fittest had taken the upper hand: the strong trying to subjugate and end the weak – affecting people, communities, social organizations and businesses alike!

6.3 EF: a world divided

As Haarmann (2004) pointed out, language is the major vehicle for organizing social relations. In the highly thought-provoking essay, he presents a four-step evolutionary process in communication across individuals and groups: communicating with signals and interjections, ‘wording’ the environment, talking about things, and interactive communication amongst the modern humans. Haarmann (p.108) notes that at the dawn of the twenty-first century, there were 6,417 languages with an uneven spread across the globe. However, English has emerged as the global medium of communication.

Even though the English language and information and communication technologies help understanding one another across continents, we are not heading towards a unified world community. In fact, there have emerged more and more nations with more and more border controls and immigration restrictions of all sorts over the years.

There are over 200 nation states or the equivalents. They have police forces for internal security and military forces – army, navy and air force to take care of external defence. The 2010–2015 average annual per-capita military expenditure was \$275 – close to the 2014 United Nations estimate of per-capita GDP of Burundi (\$279) and over twice the estimate for Somalia (\$131).²

Tables 6.1 and 6.2 show a few key correlates of military expenditure per capita. Military expenditure data are from the database of the Stockholm International Peace Research Institute. World happiness ranks and scores are from

Table 6.1 Correlation between per-capita military expenditure (2010–2015 average) and happiness index 2015

<i>Nation states</i>	<i>Correlation</i>	<i>Happiness (H) score ranges</i>
Total 141	0.54	H score top 7.5 and bottom 2.9
Top 43 – happiest	0.18	H score above 6
Next 44 – next	0.15	H score 5 to 6
Low 54 – last	0.12	H score less than 5

Table 6.2 Correlation between corruption rank 2015 and happiness index 2015

<i>Countries</i>	<i>Corruption Perception Index (CPI) Range</i>	<i>Correlation with Happiness Index</i>
Total 137	CPI 91 down to 11	0.72
Top 48	CPI over 50	0.74
Middle 53	CPI between 30–50	0.90
Bottom 36	CPI 30 and below	0.39

Helliwell, Layard and Sachs (2016). Corruption Perception Index data are from the online site of Transparency International.

Military expenditure does not correlate with happiness. Thus, those keen on improving and safeguarding happiness across the world could well consider first limiting and finally eliminating defence spending and eventually unifying the world.

An unexpected and useful result is the cross-country evidence in Table 6.2. Corruption does not help happiness. The result is reasonably sturdy. Corruption is almost always driven by greed. Greed and the fear of losing the ill-gotten wealth rarely yield happiness – which does not coexist with fear. Greed beyond need and corrupt means of satisfying it are a distressing manifestation of untruth and one dimension of evolutionary failure.

6.4 EF: violence of many forms

Conquests, colonization and slavery have violence at the core along with the cult of extremely visible and despicable inequalities. Slavery was part of American history, economy, society and demography. In 1750, 25 percent of people in America were slaves. It took a few centuries for the African-Americans to gain some respect: in the 1960s, they were recognized as equal citizens and allowed to vote. While this was great news in relative terms, the assassinations of President Kennedy and Martin Luther King Jr., and the continuing shootings at some spot or the other in the US, are indications of the persistence of some degree of violence across the nation.

The worst of EF is the tremendous intensity with which violence has been recurring, often inflicted by the strong on the weak. In his 2015 book (*Black Earth: The Holocaust as History and Warning*), Timothy Snyder of Yale University provides, in the words of a review in *The Economist*, “an impressive reassessment of the Holocaust”, demonstrating that the “superior races (German, British and American) were in a ruthless contest with lesser races for territory and natural resources”.³

It is not just strong inflicting violence on the weak; it is also related to race, community and gender. There is violence against women, beginning with the rooting out of the survival of the female child. An estimated 1.5 million girls are not allowed to be born in the world.⁴

Then there is the gun culture promoted in the world’s richest and freest nation. In late April 2016, the news agency AFP⁵ reported: “Firearms kill around 30,000 people in the US each year. However, Republican lawmakers, many of whom are backed by the powerful National Rifle Association have blocked President Barak Obama’s attempt to pass gun control legislation”.

The peace index

Had there been no violence within and across nations, the world would have been an oasis of peace and tranquility. That it was not so is amply revealed in the prominent publication on peace rankings. The Institute for Economics and Peace (Sydney, New York and Mexico City) brought out the tenth edition of the Global Peace Index Report for 2016.⁶ The Global Peace Index (GPI) is based on 23 qualitative and quantitative indicators. Global peace continues to deteriorate, and the gap between most and least peaceful has been widening. The overall index is made up of 14 internal peace indicators with a combined weight of 60 percent and nine external peace indicators with the balance of 40 percent weight.⁷

Of the 163 states for which the index has been computed, the most peaceful is Iceland with rank 1, and the least peaceful is Syria at rank 163. Thankfully, the democratic USA has a rank of 103, while dictatorial Russia is at 151. The tables turn when it comes to the most populous states, China and India, which have ranks 120 and 141, respectively. *India may be proud of its freedom, but it has to address why its peace rank is way below the not so free China.*

The report notes, among others, the following gory trends in 2016 relative to 2008: a 286 percent increase in deaths from terrorism,⁸ a five-fold increase in battle deaths, and a 2015 statistic of 57 million refugees and displaced persons.

Promoting non-violence

A Google search for “global institutions for non-violence” throws up 359,000 results, with the following occupying the top three places: M K Gandhi Institute for Nonviolence, Nonviolence International, and the 17th International

Nonviolence Summer Institute 2016 (an annual event organized by the Center for Non-violence and Peace Studies of the University of Rhode Island).

The M K Gandhi Institute for Nonviolence is one that has been working to promote nonviolence, especially amongst the young. Based in Rochester, New York, the Institute, in collaboration with academic institutions, schools, etc. works in the areas of “nonviolence education, sustainability and the promotion of racial justice”.⁹

The mission of Nonviolence International is to research and promote non-violent action. It seeks to reduce the use of violence worldwide. The mission statement adds: “We believe that every culture and religion can employ appropriate non-violent methods for positive social change and international peace”.¹⁰

Promoting peace and global beloved community through non-violence is the objective of the Center for Non-violence and Peace Studies of the University of Rhode Island. Education, training, academic courses, special programs and community events are the instruments used by the Center to accomplish its objectives.¹¹

Notwithstanding the many initiatives, violence continues to grow and has not disappeared from the radar of people at large.

6.5 EF: intellectuals could have helped to stop

Intellectuals could have stood for higher evolution: scientists who may not negate violence and untruth, since it does not fall under any scientific discipline; judges who may know the untruth in the legal arguments but may have to condone; spiritual leaders who foster divisions and not work for the unity of mankind – these are avoidable.

Every chief executive officer (CEO) of a nation, be it the Prime Minister or President or similar leader at a sub-national level, has her or his advisers from the intellectual community; some are publicly known and some are behind the curtain (who may have relatively more impact on policy). Every wrong advice or advice that is great in the short-run with limiting consequences over the medium to long term must be treated as manifestations of intellectuals not delivering on the unwritten promises of the stature they have.

Missing in UN-UDHR and SDG

UN-UDHR

The 2015 edition of the United Nations’ Universal Declaration of Human Rights (UN-UDHR)¹² was originally issued on December 10, 1948, by the UN. *The Declaration affirms the importance of friendly relations between nations and protection of human rights and freedom.* Of its 30 articles, a few important ones of relevance to this chapter are noted here.

Article 3 (A-3) proclaims that everyone has the right to life, liberty and security. A-4 and A-5 refer to prohibition of slavery and inhuman or degrading treatment. A-7 is about equal legal protection for all. A-12 prohibits arbitrary interference with one's privacy, family, home or correspondence, or to attacks upon one's honour and reputation. A-13 is about freedom of movement and residence within the borders of each State; and the right to leave any country, including one's own, and to return back to the country. A-14 is on the right to seek and to enjoy in other countries asylum from persecution. A-23 and A-24 refer to the right to social security and the realization, through national and international cooperative efforts, of economic, social and cultural rights indispensable for one's dignity and the free development of her or his personality.

Relatively more crucial and important for overall development are the spirit and intent of A-26. It is about the right to education, free and compulsory primary education, and the availability of technical and higher education based on merit. The article has the following as well on education: "It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace" and "Parents have a prior right to choose the kind of education that shall be given to their children".

UDHR-2015 has a foreword by Secretary General Ban Ki-moon. He points out: "Now available in more than 360 languages, the Declaration is the most translated document in the world. . . . It has become a yardstick by which we measure right and wrong".

The sharper the yardstick, the better can be progress. There is enough in the various articles and implied intentions of UDHR to indicate the feasibility of the eventual achievement of one world economy and polity: characterizing the move from *United Nations to One World*. But, more could have been done.

For instance, UDHR could specifically include: not only the freedom of people to move across countries, but also *settle as they wish*; and not only primary education and freedom of choice in education, but also *governments to ensure the first 12 years of education with globally accepted and recognized examinations that unify children and keep them united*.

Sustainable Development Goals (SDG)

The two gaps noted above are also found in the goals enshrined in the 2030 Agenda for Sustainable Development via the 17 aspirational "Global Goals" (Box 6.1), coming out of the United Nations Sustainable Development Summit (New York, September 2015). Of all the 17 goals, the most laudable from the point of view of the move from United Nations to One World is: *reduce inequality within and among countries*. This cannot be accomplished as long as global educational equality and free migration remain elusive.

Box 6.1 The SDG in brief

End poverty; end hunger; ensure healthy lives; ensure inclusive and equitable quality education; achieve gender equality; ensure availability and sustainable management of water and sanitation; ensure access to affordable, reliable, sustainable and modern energy for all; promote inclusive and sustainable economic growth and employment; build resilient infrastructure and foster innovation; *reduce inequality within and among countries*; make cities and human settlements inclusive, safe, resilient and sustainable; ensure sustainable consumption and production patterns; take urgent action to combat climate change; conserve and sustainably use the oceans/seas and marine resources; protect and promote sustainable use of terrestrial ecosystems, sustainably manage forests, etc.; promote peaceful and inclusive societies, provide access to justice for all and build effective, accountable and inclusive institutions at all levels; and strengthen the means of implementation and revitalize the global partnership for sustainable development.¹³

No case for free international migration?

From about the birth of economics, numerous people wrote on, and most of them canvassed for, global free trade and free movement of capital. But there is not as much discourse on the free movement of people; there are not many books promoting the idea; and none so far received an Economics Nobel for research showing the merits and benefits of the free movement of people and prescribing policies that help (Appendix 6B has the list of Nobel Prize winners in economics and their key contributions).

Even when scholars are in favour of international migration, it is with constraints and conditions at best and arguing for a stop at the worst. A 2013 book, Paul Collier's *Exodus: How Migration is Changing Our World* (Oxford University Press, 2013), points to the possible unfavourable consequences of immigration for the sending and receiving nations and warns that culturally distant immigrants could threaten the mutual respect and regard on which high-income societies depend.¹⁴

Manifestation of untruth

Untruth can take many forms, but its modern-day manifestations may or may not be clearly visible up until the worst has happened. The complexity of the modern financial system offers many avenues to hide untruth under the cloak of strategic planning, professional practice and so on.

Money, which serves as a medium of exchange and store of value, has been the best innovation to promote division of labour, economic growth and prosperity spread across all segments of mankind. It is, therefore, no exaggeration at all to say that a well-functioning financial system is a must for a nation to move ahead on the development path. How can the system suddenly fail? The subprime crisis of 2007–2008 is a manifestation of such a failure. It all started with all sorts of people, with or without the necessary financial worth, obtaining debt to buy homes that eventually could not sell. *Innovation-propelled layers of investment instruments came alive in the hope all would get rich – the guaranteed impossibility in the absence of visible and real value addition in the activity.*

One must also note that at the end of it all, the quality of regulation matters. The regulator could ensure that banks that take deposits, for example, are subject to limits in regard to the assets that they hold. Intermediaries handling other people's money should be subject to civil and criminal penalties for wrongdoing.

Some might consider that untruth and hurting others via cheating are nothing to worry about since police can be approached and legal recourse helps. For a person whose income is meagre and for whom every cent counts in terms of subsistence, the loss of a few dimes could be disastrous, and rarely can such people approach the police and the courts. The one who suffers only knows if the legal course is the most economical way to get back what she or he has lost.

Addressing inequality? Not quite

The practice of economics based on free/efficient markets hardly allows for addressing the problem of income and wealth inequality. Free markets are best to survive on and further increase inequality, but there is nothing in the free markets to reduce it.

Section 5.6 of Chapter 5 covered the policy recommendations in several books/articles on inequality. The question simply is, can they deliver less inequality? For example, if one feels that democracy will be the best recipe, then the question is why democracies have allowed inequality to worsen. It is also easy to advocate progressive taxes, government transfers, taxing wealth on a global basis and so on. Yet the rich and famous could easily escape from the tax net, at least in part via employing tax consultants with expertise in using tax laws to the advantage of the clients. *It is extremely difficult to judge whether legally sanctioned tax evasion is right or wrong.* Surely there is room for untruth and corruption in case one wishes to take the tax system for a ride. Indeed, many celebrate the fact that the world is conveniently divided into several nations which together can allow the super-rich to 'honestly' avoid excessive taxes in one place and take shelter under the so-called tax havens.

Climate change

A brilliant economist or business analyst, perhaps in close contact with policy-makers, can help rationalize the destruction of forest cover via simple cost-benefit analysis. If the present value of the estimated cost of destruction (spread over several years) is less than the immediate return one obtains from the export of timber, a policymaker may consider the logic and endorse the de-forestation. The strategic group might even promise enormous plans for forest cover increase by leaps and bounds. That promise need not be fulfilled if enough money is made via timber sales and the policymakers retire after the next election.

Box 6.2 Climate change: three short notes¹⁵

1. It is difficult to precisely define the term 'climate change'. One could recognize it when weather patterns seem to be changing more or less on a permanent basis. One manifestation of climate change is the rise in global temperatures.
2. Carbon dioxide emissions are a key factor behind climate change. Rail and road transport brought phenomenal economic progress. But they are also behind the tremendous increase in emissions, more so in the developing nations eager to catch up with the West and embracing the formula of one or more cars per family, even if roads are limited.
3. Global warming has led to the melting of polar ice caps and a rise in sea levels. Hurricanes and cyclones may hit hitherto considered safe places.

Is it not violence to destroy the forest? Is it not untruth to assume some numbers when one does not know how much is the suffering of generations yet to be born? Or, should one rationalize both by 'let the age of Kali unfold'?

Elizabeth Kolbert's (2014) publication, *The Sixth Extinction: An Unnatural History*, is about man-made climate change leading to the sixth extinction, eliminating some fifth to half of all living species within the present century. This is an EF manifestation simply because the present consumption patterns create all sorts of waste quietly destroying the green cover and polluting the air, water and earth. The result is heating of the atmosphere and the oceans. Survival of humans and others is in danger.

Indeed, there has been a lot of international cooperative activity on climate change, as the information in Box 6.3 portrays. Note, however, that there is nothing like moderating the way the humans live to imply that it is business as usual in the hope that lots of funding and some technological innovation will help solve all problems!

Box 6.3 The Paris Climate Conference action plan¹⁶

At the Paris Climate Conference of December 2015, 195 countries adopted an action plan to come into force in 2020 to limit global warming to well below 2°C. Following are the key action points: global emissions to peak as soon as possible; rapid reductions thereafter; governments to come together every five years to set more ambitious targets; track progress through a robust transparency and accountability system; strengthen societies' ability to deal with the impacts of climate change; and the European Union and other developed countries to continue to support climate action and mobilization of USD 100 billion per year by 2020–2025 and higher amounts thereafter.

Truth and non-violence not part of progress?

Not too long ago, the best one could do was be satisfied with Gross National Product (GNP) per capita as a measure of economic progress and overall well-being. Since the late 1980s and early 1990s, the Human Development Index has been widely accepted as a better measure. The accomplishment is still far short of a measure of human well-being. *As philosophers like Aristotle pointed out, well-being is a function of actions and not possessions.* It is desirable for a country to ensure individual freedom, but it is very unfortunate if one *acts* to curtail another's freedom.

One wonders why the allegiance to and practice of truth and non-violence are not found in the standard development indicators – not even in the Better Life Index (see Appendix 6C table and note).

6.6 Beyond the God delusion: a humble clarification

Darwin and his successors have shown how living creatures, with their spectacular statistical improbability and appearance of design, have evolved by slow, gradual degrees from simple beginnings. We can now safely say that the illusion of design in living creatures is just that – an illusion.

(Dawkins, 2006, p.158)

The above is one of the many core messages in *The God Delusion* by Professor Richard Dawkins (2006). The book is a frank discourse on the various aspects of a key delusion that has been behind not only moves against science in general and the theory of evolution in particular, but also indirectly against attempts (if at all there are any) towards bringing total unity amongst the humans and ushering them into one single community.

Darwin pointed out the existence of moral conduct in animals. In Chapter IV of the *Descent of Man*, he refers to the case of a troop of baboons who were crossing a valley and how those who did not yet cross were helped by those who did when the latter confronted attacking dogs. The question arises on why

humans are compassionate and kind to fellow humans beyond what one can infer from the baboons' example.

The question was addressed by Dawkins in one full chapter (Chapter 6, pp. 209–234): on *the roots of morality*. Here is a sample of the many key questions he raised in the chapter (p.215): Where does the Good Samaritan in us come from? Isn't goodness incompatible with the theory of the 'selfish gene'? His explanation is indeed convincing and simple. It is the gene that survives and enables copies, which is hence the selfish gene, but this does not mean it is transferring pure selfishness. A little later in the chapter, he points to interdependence among humans as well as a whole host of other species and provides extensive rationale for altruistic behaviour.

In spite of the tremendous logical force of Dawkins' arguments, there are two important aspects of note, just to go a little beyond the delusion part.

First, the manifestations of *that wonder called Pure or Divine Love and Compassion* need to be experienced only but not be provable in the lab. Such experiences can be shared but not guaranteed for others, and hence cannot and must not be imposed.¹⁷ Their value is informational, and each has to strive to get her or his confirmations. Their 'reality and truth' cannot be denied, as far as the experiencer is concerned. A similar experience can never be guaranteed to another. Freedom must allow the sharing of information. As stated in an earlier section, there are instances where people have struggled and practiced truth and non-violence way beyond the manifestations of interdependence among humans and altruistic behaviour.

One must have no problem in accepting Darwin's views on natural selection and altruism; but, nothing should be done to prevent evolution moving forward in the direction of humans getting addicted to the practice of truth and non-violence.

Second, the best and least controversial definition of 'God' is pure love and compassion. Surely one is welcome to place a name to signify that love.

But that name of God, and all the associated manifestations and rituals, should be personal – *exactly analogous to the name of one's mother – a name that never will be the topic of intellectual procrastination or debate.*

The implication is that religion and all the practices linked to it need to be consciously promoted as purely personal and not meant for debate and conflict. *As long as untruth and violence persist, even with vast numbers of exceptions, it is best to be free from the God delusion rather than allow that delusion to become the basis for violence.*

6.7 Two scenarios

The two scenarios refer to humanity not addressing EF, and correcting EF via appropriate measures (more on this in the next chapter).

Not addressing EF

In this scenario, untruth and violence continue to succeed. Cheating becomes pervasive as the cult of wealth accumulation reaches its peak. Inequality is the order of the day, leading to a groundswell of untruth and more violence.

The Guardian of December 19, 2014, reported that scientists are trying hard “to save a critically endangered ape species” known as the Hainan Gibbon living on the Hainan Island of China. It appears that there are only 25 of them currently, and they are considered the rarest primate species. It is touching to know that they are surviving thanks to whatever little forest area is still there on the mountain region. From numbering 2,000 in the late 1950s, their number has diminished to the present size simply due to encroachments.

This is one telling example of how man has ‘designed and implemented’ the destruction strategies for other living organisms. *Man, too, could pay the price* – not due to the designs of some other species, but due to man’s own greed and the cult of inequality propelling untruth and violence.

Complete evolution

In this scenario, it is equality in full via the expansion of love. It is the full play of truth and non-violence. Humanity has to work for gradual realization of the scenario. For now, it may sound utopian. *But, a beginning can and must be made.*

Appendix 6A

Google search results on evolutionary failure

(Accessed on August 30, 2016)

Could Pandas Be an Evolutionary Mistake

I'm an evolutionary failure! – Bhagwad's

Is the human mind an evolutionary failure? – Daily Kos

What Are the Top Ten Problems with Darwinian Evolution? – Evolution . . .

6 Formerly Kickass Creatures Ruined by Evolution – Cracked.com

Evolutionary failures (Part 1) – Medium

Are there any cases where evolution has failed? – Quora

Learning from Failure: Towards an Evolutionary Model of . . . – JSTOR

Giant Panda's Vegetarian Plight: An Evolutionary Dilemma? | Answers . . .

The fundamental failure of the evolutionary psychology premise . . .

Appendix 6B

Nobel laureates in economics and acknowledged area of expertise

<i>Number</i>	<i>Year</i>	<i>Key contribution of Winner(s)</i>	<i>Winners</i>
1.	1969	Applied dynamic models for the analysis of economic process	Ragnar Frisch and Jan Tinbergen
2.	1970	Static and dynamic economic theory . . . raising the level of analysis in economic science	Paul Samuelson
3.	1971	Empirically founded interpretation of economic growth which has led to new and deepened insight into the economic and social structure and process of development	Simon Kuznets
4.	1972	Pioneering contributions to general economic equilibrium theory and welfare theory	John Hicks and Kenneth Arrow
5.	1973	Development of the input–output method	Wassily Leontief
6.	1974	Pioneering work in the theory of money and economic fluctuations	Gunnar Myrdal and Friedrich Hayek
7.	1975	Contributions to the theory of optimum allocation of resources	Leonid Kantorovich and Tjalling Koopmans
8.	1976	Achievements in the fields of consumption analysis, monetary history and theory	Milton Friedman
9.	1977	Path-breaking contributions to the theory of international trade	Bertil Ohlin and James Meade
10.	1978	Pioneering research into the decision-making process within economic organizations	Herbert A. Simon
11.	1979	Pioneering research . . . with particular consideration of the problems of developing countries	Theodore Schultz and Arthur Lewis
12.	1980	Creation of econometric models and their application	Lawrence Klein

<i>Number</i>	<i>Year</i>	<i>Key contribution of Winner(s)</i>	<i>Winners</i>
13.	1981	Analysis of financial markets and their relations to expenditure decisions, employment, production and prices	James Tobin
14.	1982	Seminal studies of industrial structures, functioning of markets	George Stigler
15.	1983	New analytical methods in economic theory and rigorous reformulation of the theory of general equilibrium	Gerard Debreu
16.	1984	Fundamental contributions to the development of systems of national accounts	Richard Stone
17.	1985	Pioneering analysis of saving and financial markets	Franco Modigliani
18.	1986	Development of the contractual and constitutional bases for the theory of economic and political decision-making	James M. Buchanan Jr
19.	1987	Contributions to the theory of economic growth	Robert M. Solow
20.	1988	Pioneering contribution to the theory of markets and efficient utilization of resources	Maurice Allais
21.	1989	Clarification of the probability theory foundations of econometrics and analysis of simultaneous economic structures	Trygve Haavelmo
22.	1990	Pioneering work in the theory of financial economics	Harry M. Markowitz, Merton H. Miller and William F. Sharpe
23.	1991	Discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy	Ronald H. Coase
24.	1992	Extending the domain of microeconomic analysis to a wide range of human behaviour and interaction, including non-market behavior	Gary S. Becker
25.	1993	Research in economic history by applying economic theory and quantitative methods to explain economic and institutional change	Robert W. Fogel and Douglass C. North
26.	1994	Pioneering analysis of equilibria in the theory of non-cooperative games	John C. Harsanyi, John F. Nash Jr. and Reinhard Selten

(Continued)

(Continued)

<i>Number</i>	<i>Year</i>	<i>Key contribution of Winner(s)</i>	<i>Winners</i>
27.	1995	Development and application of the hypothesis of rational expectations	Robert E. Lucas Jr.
28.	1996	Fundamental contributions to the economic theory of incentives under asymmetric information	James A. Mirrlees and William Vickrey
29.	1997	A new method to determine the value of derivatives	Robert C. Merton and Myron S. Scholes.
30.	1998	Contributions to welfare economics	Amartya Sen
31.	1999	Analysis of monetary and fiscal policy under different exchange rate regimes and analysis of optimum currency areas	Robert A. Mundell
32.	2000	Development of theory and methods for analyzing discrete choice	Daniel L. McFadden
	2000	Development of theory and methods for analyzing selective samples	James J. Heckman
33.	2001	Analyses of markets with asymmetric information	George A. Akerlof, A. Michael Spence and Joseph E. Stiglitz
34.	2002	Establishing laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms	Vernon L. Smith
	2002	Integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty	Daniel Kahneman
35.	2003	Methods of analyzing economic time series with common trends (co-integration)	Clive W. J. Granger
	2003	Methods of analyzing economic time series with time-varying volatility	Robert F. Engle III
36.	2004	Contributions to dynamic macroeconomics: the time consistency of economic policy and the driving forces behind business cycles	Finn E. Kydland and Edward C. Prescott
37.	2005	Enhanced understanding of conflict and cooperation through game-theory analysis	Robert J. Aumann and Thomas C. Schelling
38.	2006	Analysis of inter-temporal trade-offs in macroeconomic policy	Edmund S. Phelps
39.	2007	Foundations of mechanism design theory	Leonid Hurwicz, Eric S. Maskin and Roger B. Myerson

<i>Number</i>	<i>Year</i>	<i>Key contribution of Winner(s)</i>	<i>Winners</i>
40.	2008	Analysis of trade patterns and location of economic activity	Paul Krugman
41.	2009	Analysis of economic governance, especially the boundaries of the firm	Oliver E. Williamson
		Analysis of economic governance, especially the commons	Elinor Ostrom
42.	2010	Analysis of markets with search frictions	Peter A. Diamond, Dale T. Mortensen and Christopher A. Pissarides
43.	2011	Empirical research on cause and effect in the macroeconomy	Thomas J. Sargent and Christopher A. Sims
44.	2012	Theory of stable allocations and the practice of market design	Alvin E. Roth and Lloyd S. Shapley
45.	2013	Empirical analysis of asset prices	Eugene F. Fama, Lars Peter Hansen and Robert J. Shiller
46	2014	Analysis of market power and regulation	Jean Tirole
47	2015	Analysis of consumption, poverty and welfare	Angus Deaton

Source of basic information: http://www.nobelprize.org/nobel_prizes/facts/economic-sciences

Appendix 6C

Table

Table A6.1 Inter-correlations (percent) for selected OECD better life indicators, 2016 edition (covering the 35 OECD countries)

<i>Selected Indicators of Better Life (Code)</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>
Dwellings % with basic facilities (A)		-61	-11	-55	-20	-52	-31	-56	-48	-56	33
Household disposable income \$ (B)			-30	60	9	61	42	49	66	60	-35
Long-term unemployment rate % (C)				-5	16	-37	-19	-5	-46	-8	-15
Quality of community support % (D)					36	63	31	54	62	65	-53
Education (years) (E)						48	25	16	31	44	-43
Water quality % (F)							14	23	61	70	-37
Voter turnout % (G)								41	40	15	-19
Perception on health % (H)									69	30	-7
Average life satisfaction score (I)										55	-15
Feeling safe walking alone in night % (J)											-57
Homicide rate (ratio) (K)											

Note: *Better life is still seen in terms of material possessions along with aspects of community and safety perceptions. There is no explicit concern for the practice of human values such as truth, non-violence and right conduct, as if they do not matter for better life.*

Notes

- 1 <https://www.google.co.in/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=evolutionary%20failure> [Accessed on August 30, 2016].
- 2 [https://en.wikipedia.org/wiki/List_of_countries_by_GDP_\(nominal\)_per_capita](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal)_per_capita) [Accessed on September 28, 2016].
- 3 Dark days of the 1940s: Re-examining the Holocaust, *The Economist*, October 24, 2015, p.80.

- 4 <http://www.prb.org/pdf12/gender-bias-sex-selection.pdf> [Accessed on December 1, 2016].
- 5 <http://www.abc.net.au/news/2016-04-23/ohio-shooting-leaves-eight-members-of-one-family-dead/7352478> [Accessed on April 25, 2016].
- 6 <http://economicsandpeace.org/> [Accessed on August 27, 2016].
- 7 **Internal peace indicators (60 percent weight)**: level of perceived criminality in society; number of internal security officers and police per 100,000 people; number of homicides per 100,000 people; number of jailed population per 100,000 people; ease of access to small arms and light weapons; intensity of organized internal conflict; likelihood of violent demonstrations; level of violent crime; political instability; political terror scale; conventional weapons imports per 100,000 people; impact of terrorism; number of deaths from organized conflict (internal); and number and duration of internal conflicts.
- External Peace Indicators (40 percent weight)**: military expenditure as percent of GDP; number of armed services personnel per 100,000 people; financial contribution to UN peacekeeping missions; nuclear and heavy weapons capabilities; exports of major conventional weapons per 100,000 people; number of refugees and internally displaced persons as percent of population; relations with neighbouring countries; number, duration and role in external conflicts; and number of deaths from organized conflict (external).
- 8 The Institute for Economics and Peace also brings out reports on the Global Terror Index. The latest report is for 2015.
- 9 <http://www.gandhiinstitute.org/contact-us-2/> [Accessed on August 19, 2016].
- 10 More information is available on its website: <http://nonviolenceinternational.net/wp/about/>.
- 11 More can be learnt from the website: <http://web.uri.edu/nonviolence>.
- 12 http://www.un.org/en/udhrbook/pdf/udhr_booklet_en_web.pdf [Accessed on August 17, 2016].
- 13 Based on <http://www.un.org/sustainabledevelopment/sustainable-development-goals/> [Accessed on November 15, 2016].
- 14 See Clemens, Michael and Sandefur, Justin, "Let the People Go", *Foreign Affairs*, January–February 2014, 152–159.
- 15 Source: based on the matter from <http://whatsyourimpact.org/climate-change?gclid=CITNx9eXtswCFc8TaAodk1kBvw> [Accessed on September 8, 2016].
- 16 Source: http://ec.europa.eu/clima/policies/international/negotiations/paris/index_en.htm [Accessed on October 1, 2016].
- 17 For instance, a listing of the author's experiences of divine love and compassion is available at <https://bhanoji.wordpress.com> in a post dated January 12, 2016.

7 Addressing evolutionary failure

The way forward

The evolution of humans from animals may be an empirical fact. Giving up animal spirits by humans is a logical necessity.

What aspect or novel variable in human evolution can explain the legendary figures such as Mahatma Gandhi, Martin Luther and Mother Theresa? Should they be considered ‘evolutionary outsiders’, a concept introduced in 1998 by David Loye?¹ Or, should humanity aspire for future evolution to go for an on-course correction to eliminate evolutionary failure and eliminate untruth and violence?

7.1 Evolution of thinking

In the evolution of the human species, a lot of thinking must have gone into each and every practice, such as making tools and working with them; designing languages, counting numbers; countering and curing human illnesses of various types; and so on. The subject has been ably, brilliantly and authoritatively tackled by Maxine Sheets-Johnstone (1990). With apologies to the science of psychology and its nomenclature, simply put, the thesis (hypothesis?) of Sheets-Johnstone is that the human body and its senses have been the basis of experiencing the capability to distinguish, discriminate and extrapolate – all part of human thought processes. Thus, the sense of touch helped in knowing sharpness, leading to tool making. The sense of sound made it possible for language to emerge. The knowledge that the hand can draw resulted in painting and writing. These must have been the ancestral foundations for the thousands of accomplishments in science, technology, music, prose, poetry and so on that we see today.

The very thinking and the capacity to discriminate that evolved over the millennia should help foster the passion to address evolutionary failure with concrete results for all to see.

7.2 Basic unity of mankind

In his 2006 book on the possible convergence of science and spirituality, the Dalai Lama (2006, p.195) notes the discovery of minimal diversity in the genomes of different ethnic groups and then makes the important observation:

“... differences of colour, language, religion, ethnicity, and so forth among human beings have no substance in the face of our basic sameness”.²

The same idea of basic unity of all beings is in the following quote from a speech of Sri Sathya Sai Baba:

Divinity expresses itself infinitely as the five elements. . . . All creation is but a combination of two or more of these in varying proportions. The characteristic nature of these elements is sound, touch, form, taste and smell, cognized by the ear, the skin, the eye, the tongue and the nose.³

The fundamental unity behind all the apparent diversity is the scientific and philosophical basis for the fight against evolutionary failure and for aiming for unity, peace and one world community.

7.3 Addressing EF

Addressing evolutionary failure is possible. Humans have the capacity to gradually minimize and eventually eradicate untruth and violence. *The Economist* of August 15, 2015 (p.14), refers to its founding editor, James Wilson, and affirms its engagement in the “severe contest between intelligence, which presses forward, and an unworthy, timid ignorance obstructing progress”. Addressing evolutionary failure calls for the march of intelligence and a stop to ignorance and its manifestations: untruth and violence.

The author of this book hopes that the world’s top intellectuals – winners of Nobel Prizes and the like – will address the issue of evolutionary failure, motivate the world leaders and the common people alike to get addicted to truth and non-violence, and ensure the march towards one world for the entire human race.

A plea to Nobel laureates: collaborate and arrest EF

According to a *Time* 2008 article,⁴ Alfred Nobel, who invented the deadly and destructive dynamite, was hoping for a war-free world. He was banking on the process of the military might of different nations becoming a deterrent for its use and hoped that “all civilized nations will retreat and disband their troops”.⁵

The good news is we have the prestigious prizes instituted as desired by Nobel in his will. The bad news is the civilized nations did not disband their troops. Developments after Nobel went the other way. The world witnessed two World Wars. Conflicts continue at one place or the other. Gadgets of destruction did not stop with dynamite; the world now has atomic weapons. Continuing discourses and treaties to promote nuclear non-proliferation are hardly expected to yield their total abandonment. In fact, in September 2016, North Korea tested a nuclear device.

Close to a thousand people have received the Nobel Prize since its inception in 1901. Over 290 laureates are now alive. They are a great resource with tremendous intellectual influence and prestige. The plea is for them to come

together as *IGPU – Intellectuals for Global Peace and Unity* with a definite action agenda for use by all the world leaders and policymakers at the national, regional and global levels.

The IGPU agenda

There is a lot that IGPU can do to arrest EF. The initiatives to motivate the seven billion people to adhere to contextual truth and non-violence can neither be aimed at any one segment of the population nor expected to be accomplished in a short time span. The motivation to one and all to adhere to truth and non-violence and avoid untruth and violence has to reach school children, teachers, politicians, civil servants, lawyers, accountants and the whole array of professionals within nations; national and global leaders; artists and writers; and many more.

IGPU is the hope. Hundreds of agenda items will emerge over time once IGPU starts functioning. The following two sections, respectively, contain illustrative/brief discourses of two action agenda items: promoting free movement of people across the world (as a manifestation of the basic truth of earth belonging to all), and promoting non-violence. Indicative steps for possible implementation are also noted. It is important to affirm that the short discourses are at best illustrative with no claim for completion in coverage and depth.

7.4 Promoting free movement of people

None can claim ownership of the earth. All boundaries were results and consequences of conquest, colonization and commercial convenience. Muscle power, money power and mind power were the M3 used for conquests. Man thus achieved great competence in dividing the world. The next phase of human evolution must be to achieve the unity of mankind via the promotion of One United World.

One of the problems noted in the earlier chapter is the growing inequalities in income and wealth in both industrial and developing countries. As pointed out by Branko Milanovic in an interview for Demos,⁶ some 50 to 60 percent of income differences between individuals in the world are due to the mean income differences between the countries where people live. In addition, about 20 percent is due to the income level of one's parents. It is not at all an exaggeration to say that the level of inequality will settle to the most amicable and widely accepted level only decades after free migration unites the world into one geography and economy, a far cry for the present, given the miniscule global migration taking place: "In the last quarter of century, the percentage of people who live in the countries where they were not born has been stable at between 2 and 3 percent" (based on the Milanovic interview referred to earlier).

Table 7.1 Future population ageing scenario

Region	Population 60+ in Total (%)			Median Age of the Population			
	1980	2010	2040	1950	2010	2025	2050
World	8.6	11.1	18.6	24	29	32	36
More developed regions	15.5	21.8	30.6	28	40	43	44
Less developed regions	6.4	8.7	16.6	21	26	30	35
Least developed regions	5.1	5.3	8.2	19	19	22	26

Source: United Nations, Department of Economic and Social Affairs, Population Division (2013), *World Population Ageing*, 2013, New York: United Nations

Freeing international migration is also necessary to tackle an important problem looming large in regard to global demographics. The data in Table 7.1 hint at the feasibility of the aged in the industrial countries benefiting from the services of the young of the developing nations. It is in the realm of reality to think of a robot helping a rich old man in US or Europe go round doing his routine; instead, it is a win-win for a young person from Africa or Asia to help the same old man. The difference is the human touch and warmth. In the process, a child of the serving person might end up going to a Harvard or Stanford, forever acknowledging the blessing showered by the United World.

In the 2012 *Cato Journal* article “Why Should We Restrict Immigration”, Professor Bryan Caplan of George Mason University makes a very elegant argument (p.6): “Economists’ consensus estimate is that open borders would roughly double world GDP, enough to virtually eliminate global poverty. . . .” Laudable indeed is the final set of conclusions in the paper by Caplan (2012, p.24), noting how any negative impacts can be addressed: higher taxes or admission fees on immigrants; making them ineligible for some of the benefits citizens may be getting; and so on. In his considered view, “immigration restrictions are a needlessly draconian remedy”.

There were always some people who entertained the idea of One World, especially after the two World Wars ended and the pursuit of peace became the cherished goal. The site openborders.info, for example, provides space for people to voice opinions on open borders. The site allows and uploads opinions of supporters of open borders and free immigration as well as those who oppose. The openborders.info welcome blog of March 16, 2012, recognizes the empirical fact that no country has as yet gone for open borders. It is laudable that the matter is not forgotten and is kept alive.

EU inspires (despite Brexit)

A world that is united as one economic and political entity need not be considered utopian, going by the inspiring example of the European Union established in 1993. The precursor to the EU was the European Economic Community (EEC), formed in 1958 with six member nations (Belgium, France, West Germany, Italy, Luxembourg and the Netherlands). Six more joined during 1973–1986: Denmark, UK and Ireland in 1973; Greece in 1981; and Portugal and Spain in 1986. *The European Union* could have inspired the rest of the world with its laudable four freedoms (Box 7.1) and the whole world could have come together.

Box 7.1 EU’s four freedoms⁷

Free movement of goods, freedom of movement for workers, right of establishment and freedom to provide services, and free movement of capital are the four freedoms.

Free movement of goods: This has been achieved since January 1993. All controls on the movement of goods within the EU have been abolished. It is one unified market.

Freedom of movement for workers: EU law guarantees it as one of the fundamental freedoms. Every EU citizen has the right to move freely, and to stay and work in another member state, with some exceptions applicable to the public sector.

Right of establishment and freedom to provide services: The key objective here is to ensure an internal market in services.

Free movement of capital: All restrictions are to be removed in order to ensure free movement of capital within the EU, and outside also as far as feasible.

The June 23, 2016, referendum in the British Parliament was to help the nation to leave the EU. As pointed out by Peter Hall, Harvard’s Professor of European Studies, the referendum saw a 52 percent vote to leave, backed by populist nationalism. (Hall, 2016). The concern of those who canvassed for Brexit was mostly about the freedoms associated with the EU and notably the free movement of people. By 2013, the total membership rose to 28, which might go down to 26 if the departure of Ireland and UK is eventually confirmed.

Some might think that the UK, by leaving the EU, may not help the idea of One World. A hopeful way to look at it is that the UK will be favourably disposed to global migration freedoms once IGPU seeks such an initiative; after all, the UK is second only to the US in terms of total number of Nobel laureates.⁸

Migration freedom only the first step

Migration freedom, alongside the removal of restrictions on goods and capital movements leading to the formation of one integrated world economy, is just the first step in the creation of the united world. Several other, more difficult, steps have to be designed and implemented to reach the final goal. *The most crucial and perhaps the final step is the winding up of national defence systems. Then and then alone one sees the end of the nation state and the birth of the One World.*

With close to 200 sovereign nations with their own constitutions, political ideologies and governments, it may seem nothing short of an idealistic daydream to think about the united world becoming a reality.

There is hope. The IGPU can make it happen. Sixty percent of the world population (in 2016) lives in just 11 nations: China (18.7 percent), India (18 percent), US (4.4 percent), Indonesia (3.5 percent), Brazil (2.8 percent), Pakistan (2.7 percent), Nigeria (2.5 percent), Bangladesh (2.2 percent), Russia (1.9 percent), Mexico (1.7 percent) and Japan (1.7 percent). The Presidents/Premiers of the 11 nations coming together and signing a *One World Resolution* is possible if the thousands of intellectuals coming together under the IGPU urge them to make the beginning for a One United World. It is in the realm of the possible to have a *World Identity Card* to recognize the global citizenry.

Global equality in education and health

Facilitating equality within the present-day nation states and the eventual *united world* will call for the equalization of educational opportunities and health care facilities across the world. Towards this end, the IGPU could advocate the promotion of a *Global Education and Health Foundation* uniting the charitable organizations of the world,⁹ which becomes the center for all donations to accumulate, with disbursements decisions taken by an expert body.

One global twelfth-grade examination with universal recognition is the grand and final aim of educational activity, while the provision of a global health insurance card is the goal of health care endeavours.

7.5 Promoting non-violence¹⁰

As long as violence of one form or the other prevails, there is no way one can achieve the free movement of people, the foundation for building the One World. Selling guns like selling milk and honey will only mean the opposite of promoting non-violence. The major voices against guns appear to be fighting a losing battle.¹¹ The killing of 20 small children and 6 staff members in an elementary school in Newtown, Connecticut, USA, in December 2012, would have been avoided if the killer's mother did not have a gun collection. Year after year, there is no dearth of such news (Box 7.2).

Box 7.2 Gun violence in the USA: a few facts

The Law Center to Prevent Gun Violence provides statistics and other pertinent information on US gun control. The estimated cost of gun violence in the US was put at USD \$229 billion a year, close to \$700 per capita.¹²

The Trace speaks about 15 statistics indicators about gun violence in the year 2015. Some of the indicators are: the number killed was 12,942, including 786 under the age of 18; half of those killed were African American men; and 8 percent of gun owners own a stockpile of ten or more weapons each.¹³

At the minimum, extremely stringent checks are needed before an ordinary citizen (outside permitted professionals such as police and other internal security officials) is allowed to possess a gun. This is a purely supply-side action that could help promotion of non-violence only to a limited extent. Yet it is an important step forward. Stated succinctly, the *eventual goal should be a total global ban on civilian sales of guns, with the advantage that laws can be passed to ensure civilians possessing guns anywhere in the world will face equally stringent punishments.*

Then there is direct action to promote non-violence. Appendix 7B shows the names of Noble laureates who won the prize for the promotion of peace during 1991–2015. Box 7.3 provides a short extract based on the key contributions of the prize winners.

Box 7.3 Nobel Peace Prize winners' initiatives in brief

The prize winners' initiatives included: struggle against the suppression of children; efforts to eliminate chemical weapons; non-violent struggle for the safety of women; non-violent struggle for fundamental human rights in different parts of the world; efforts to resolve international conflicts; efforts towards countering climate change; promotion of nuclear energy for peaceful purposes; promotion of peace, democracy and human rights in different parts of the world; and banning and clearing of anti-personnel mines (for more details, see Appendix 7B).

The Nobel Prize for Peace is an indicator of the prevalence of violence in one form or the other. Although people do not seem to give credit to those who strive to save forests, animals, rivers and the earth at large, one must feel good that preventing violence against humans is getting increasing recognition. It can take many forms: violence against elderly and children in general, and women and girls in particular.

Violence against children has been the focus of a recent report by UNICEF (Box 7.4). The report points to the endless violence across the globe, a lot of which can be countered with the conscious pursuit of global unity and promotion of non-violence. Violence can also be an expression of various forms of intolerance by the perpetrators towards differences in race, language, locality, possessions and so on.

Box 7.4 Plight of uprooted children

In September 2016, UNICEF brought out a report entitled *Uprooted: The Growing Crisis for Refugee and Migrant Children* – a publication with global and regional data on the plight of children forced to leave the nations of their birth.

Grim facts: nearly 50 million children (though the estimate is a conservative one) have “migrated across borders or been forcibly displaced. More than half of them – 28 million – fled to escape from *violence and insecurity*.”

The website nonviolence.com is about bringing people together to promote peace and non-violence: “Everything we do, we do because we want to end violence. We simply believe that violence is bad and peace is good”. The organization uses the strategy of inspiring and motivating “young people to learn to solve conflicts peacefully”.¹⁴

There is no dearth of ideas and suggestions in regard to promoting non-violence. The state of New Jersey official website has a simple PDF document containing ten tips to promote non-violence quoted from December 2005 issue of *ODE Magazine*.¹⁵ The following is a sample of the tips:

- Remember that all humans have the same needs.
- Before agreeing or disagreeing with anyone’s opinions, try to tune into what the person is feeling or needing.
- Instead of saying ‘no’, look at what need of yours prevents you from saying ‘yes’.

A major implication of all initiatives on promoting non-violence is that the change has to come at the individual level and that peace is the end result of the permanent elimination of all forms of violence. *The Nobel Peace Prize, as long as it is received, reminds the vast humanity that it has yet to evolve out of evolutionary failure.*

Emeritus Professor Michael Nagler of the Institute for South Asia Studies at the University of California, Berkeley, brought out *The Search for a Nonviolent Future* (Nagler, 2004). In his foreword (p.x), Arun Gandhi, the grandson of Mahatma Gandhi, speaks of the many facets of violence: “wars, fights, riots, beatings, rapes, murders, etc., (and) “passive” violence, . . . wasting resources,

overconsumption, hate, prejudice, name calling, and hundreds of seemingly innocent acts that hurt people even unconsciously”.

On pages 286–294 in his book, Nagler (2004) provides an action guide for the realization of a non-violent future. The guide comprises five steps: *truth in thinking, taking care of ourselves spiritually, truth in relating, non-violence literacy*, and finally, *action for peace*. The most comprehensive of the recommendations is *action for peace*. In a nutshell, it seeks to move away from wars and all underlying factors that propel conflicts.

A final point to note is that what might look utopian today can become fact at some future point. Professor Barry Gordon, specialist in neurology and cognitive science at the Johns Hopkins University School of Medicine, makes the point that many of the functions of the mind are outside of conscious control.¹⁶ The implication is that man can train the mind and become more and more aware. There is hope for a non-violent world if the 7 billion minds are tuned towards achieving the same.

7.6 UNESCO should take the lead

A page of the UNESCO website says:

Since its inception, UNESCO has been working towards a truly global movement for fostering a culture of peace and non-violence worldwide and has been designated by the UN General Assembly as the lead agency for many prominent global initiatives for promoting peace.

And, furthermore, “UNESCO is working towards a truly global movement for fostering a culture of peace and non-violence worldwide”.¹⁷

UNESCO could support the IGPU idea and bring together the global Nobel laureates and other intellectuals for one or two annual meetings to formulate plans and implementation strategies and monitor time-bound results in regard to freeing global migration and promotion of non-violence to begin with.

An end note

The world’s intellectuals and prestigious global organizations like UNESCO are all that Mother Earth has to accomplish the great tasks and usher in the One United World. For now, there is hope only in IGPU, the highest powerhouse one can think of, with none to match. The intellectuals of the world must unite for the sake of the future of a world that is united and free from violence.

It is not the violence of the few that scares me. It is the silence of the many.
– Martin Luther King Jr.

Appendix 7A

A brief on the Humanist Manifesto 2003

The American Humanist Association brought out the 2003 edition (the third edition) of the Humanist Manifesto, 70 years after the original issue in 1933. Of some 71 signatories on the document, there were as many as 17 Nobel laureates: nine in Chemistry, four in Physics and four in Medicine. The following statements are derived from the document.¹⁸

Humanism stands for ethical living aimed at both personal fulfillment and the greater good of humanity at large. It is guided by reason and inspired by compassion. The scientific method is acknowledged as the best for developing knowledge and solving problems. The humanists are committed to respecting others and for making “choices in a context of freedom consonant with responsibility” (p.1 of the Manifesto).

Humanists long for and strive toward a world of mutual care and concern, free of cruelty and its consequences. . . . The joining of individuality with interdependence . . . inspires hope of attaining peace, justice, and opportunity for all.

(Humanist Manifesto 2003, p.1)

The responsibility for our lives and the kind of world in which we live is ours and ours alone.

Appendix 7B

Nobel Peace Prize winners, 1991–2015

<i>Year</i>	<i>Prize Winner</i>	<i>Achievement in Brief</i>
2015	National Dialogue Quartet	For its decisive contribution to the building of a pluralistic democracy in Tunisia in the wake of the Jasmine Revolution of 2011
2014	Kailash Satyarthi and Malala Yousafzai	For their struggle against the suppression of children and young people and for the right of all children to education
2013	Organisation for the Prohibition of Chemical Weapons	For its extensive efforts to eliminate chemical weapons
2012	The European Union	For over six decades, contributed to the advancement of peace and reconciliation, democracy and human rights in Europe
2011	Tawakkol Karman, Ellen Johnson Sirleaf and Leymah Gbowee	For their non-violent struggle for the safety of women and for women's rights to full participation in peace-building work
2010	Liu Xiaobo	For his long and non-violent struggle for fundamental human rights in China
2009	Barack H Obama	For his extraordinary efforts to strengthen international diplomacy and cooperation between peoples
2008	Martti Ahtissari	For his important efforts, on several continents and over more than three decades, to resolve international conflicts
2007	Intergovernmental Panel on Climate Change (IPCC) and Al Gore Jr	For their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change
2006	Muhammad Yunus and Grameen Bank	For their efforts to create economic and social development from below
2005	International Atomic Energy Agency (IAEA) and Mohamed ElBaradei	For their efforts to prevent nuclear energy from being used for military purposes and to ensure that nuclear energy for peaceful purposes is used in the safest possible way

<i>Year</i>	<i>Prize Winner</i>	<i>Achievement in Brief</i>
2004	Wangari Muta Maathai	For her contribution to sustainable development, democracy and peace
2003	Shirin Ebadi	For her efforts for democracy and human rights
2002	Jimmy Carter	For his decades of untiring effort to find peaceful solutions to international conflicts, to advance democracy and human rights, and to promote economic and social development
2001	UN and Kofi Annan	For their work for a better organized and more peaceful world
2000	Kim Dae-jung	For his work for democracy and human rights in South Korea and in East Asia in general, and for peace and reconciliation with North Korea in particular
1999	Médecins Sans Frontières	In recognition of the organization's pioneering humanitarian work on several continents
1998	John Hume and David Trimble	For their efforts to find a peaceful solution to the conflict in Northern Ireland
1997	International Campaign to Ban Landmines (ICBL) and Jody Williams	For their work for the banning and clearing of anti-personnel mines
1996	Carlos Filipe Ximenes Belo and José Ramos-Horta	For their work towards a just and peaceful solution to the conflict in East Timor
1995	Joseph Rotblat and Pugwash Conferences on Science and World Affairs	For their efforts to diminish the part played by nuclear arms in international politics and, in the longer run, to eliminate such arms
1994	Yasser Arafat, Shimon Peres and Yitzhak Rabin	For their efforts to create peace in the Middle East
1993	Nelson Mandela and Frederik Willem de Klerk	For their work for the peaceful termination of the apartheid regime, and for laying the foundations for a new democratic South Africa
1992	Rigoberta Menchú Tum	In recognition of her work for social justice and ethno-cultural reconciliation based on respect for the rights of indigenous peoples
1991	Aung San Suu Kyi	For her non-violent struggle for democracy and human rights

Notes

- 1 <http://www.integralleadershipreview.com/archives/2009-08/2009-08-article-loye.php> [Accessed on February 20, 2013].
- 2 One can keep on adding unifiers from genomes to routine behaviour commonalities. For instance, consider bathing. Humanity in different geographical locations got into the habit at their own pace independent of others at other locations. For more details on bathing habits and history, see <https://en.wikipedia.org/wiki/Bathing> [Accessed on May 27, 2015].
- 3 From Sri Sathya Sai Baba's Discourse on October 15, 1966. A magnificent collection of His writings and speeches can be obtained from the site satyasai.org and several similar ones across the globe.
- 4 <http://content.time.com/time/arts/article/0,8599,1847407,00.html>.
- 5 Ibid.
- 6 <http://www.demos.org/blog/11/14/14> [Accessed on September 12, 2016].
- 7 Source: <http://www.europeanpolicy.org/en/european-policies/single-market.html> [Accessed on September 12, 2016].
- 8 Considering the period 1901–2015, the following are the top winners: US (353 winners in all), UK (125), Germany (105), France (61) and Sweden (30). Source: <http://www.worldatlas.com/articles/top-30-countries-with-nobel-prize-winners.html> [Accessed on September 15, 2016].
- 9 The website of *CEOWORLD* magazine provides pertinent information for 2015 on the *top 10 largest private charitable foundations created by the richest people*. Practically all of them are involved in promoting health and education. The worth of the 2015 assets of these foundations was \$83 billion. The foundations: Bill & Melinda Gates Foundation, Li Ka Shing Foundation, Gordon and Betty Moore Foundation, Bloomberg Philanthropies, Children's Investment Fund Foundation, Sulaiman Bin Abdul-Aziz Al Rajhi Endowments, Open Society Foundation, Susan Thompson Buffett Foundation, Carlos Slim Foundation, and Charles and Lynn Schusterman Family Foundation.
- 10 The Humanist Manifesto of the American Humanist Association has the implicit message of non-violence to ensure peace within the framework of inter-human interdependence. A short extract on the Manifesto is given in Appendix 7A.
- 11 Why the Gun Lobby Is Winning, *The Economist*, April 4, 2015, 34.
- 12 <http://smartgunlaws.org/costs-of-gun-violence-statistics/> [Accessed on September 14, 2016].
- 13 <https://www.thetrace.org/2015/12/gun-violence-stats-2015/> [Accessed on September 1, 2016].
- 14 <http://www.nonviolence.com/> [Accessed on September 13, 2016].
- 15 <http://www.nj.gov/education/holocaust/resources/TenTipstoPromoteNonViolence.pdf> [Accessed on September 14, 2016].
- 16 <http://www.scientificamerican.com/article/can-we-control-our-thoughts/> [Accessed on January 16, 2015].
- 17 <http://en.unesco.org/partnerships/partnering/promoting-culture-peace-and-non-violence> [Accessed on September 9, 2016].
- 18 They are, in general, summary versions of the original statements in the document. When exactly quoted from the document, quotes are used.

Epilogue

Hope for humanity

The hope is that humanity will evolve well beyond just the physical. It does not matter one iota if people differ in height, weight and complexion. What matters is human evolution into one global family; and the emergence of a peaceful, united world. This is achievable if the intellectuals of the world unite and show the way.

Prayer of Saint Francis of Assisi

Lord, make me an instrument of thy peace!
That where there is hatred, I may bring love
That where there is wrong, I may bring the spirit of forgiveness
That where there is discord, I may bring harmony
That where there is error, I may bring truth
That where there is doubt, I may bring faith
That where there is despair, I may bring hope
That where there are shadows, I may bring light
That where there is sadness, I may bring joy
Lord, grant that I may seek rather to comfort, than to be comforted
To understand, than to be understood
To love, than to be loved
For it is by self-forgetting that one finds
It is by forgiving that one is forgiven
It is by dying that one awakens to Eternal Life

There is only one caste: The caste of humanity
There is only one religion: The religion of love
There is only one God: He is Omnipresent

Bhagawan Sri Sathya Sai Baba

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